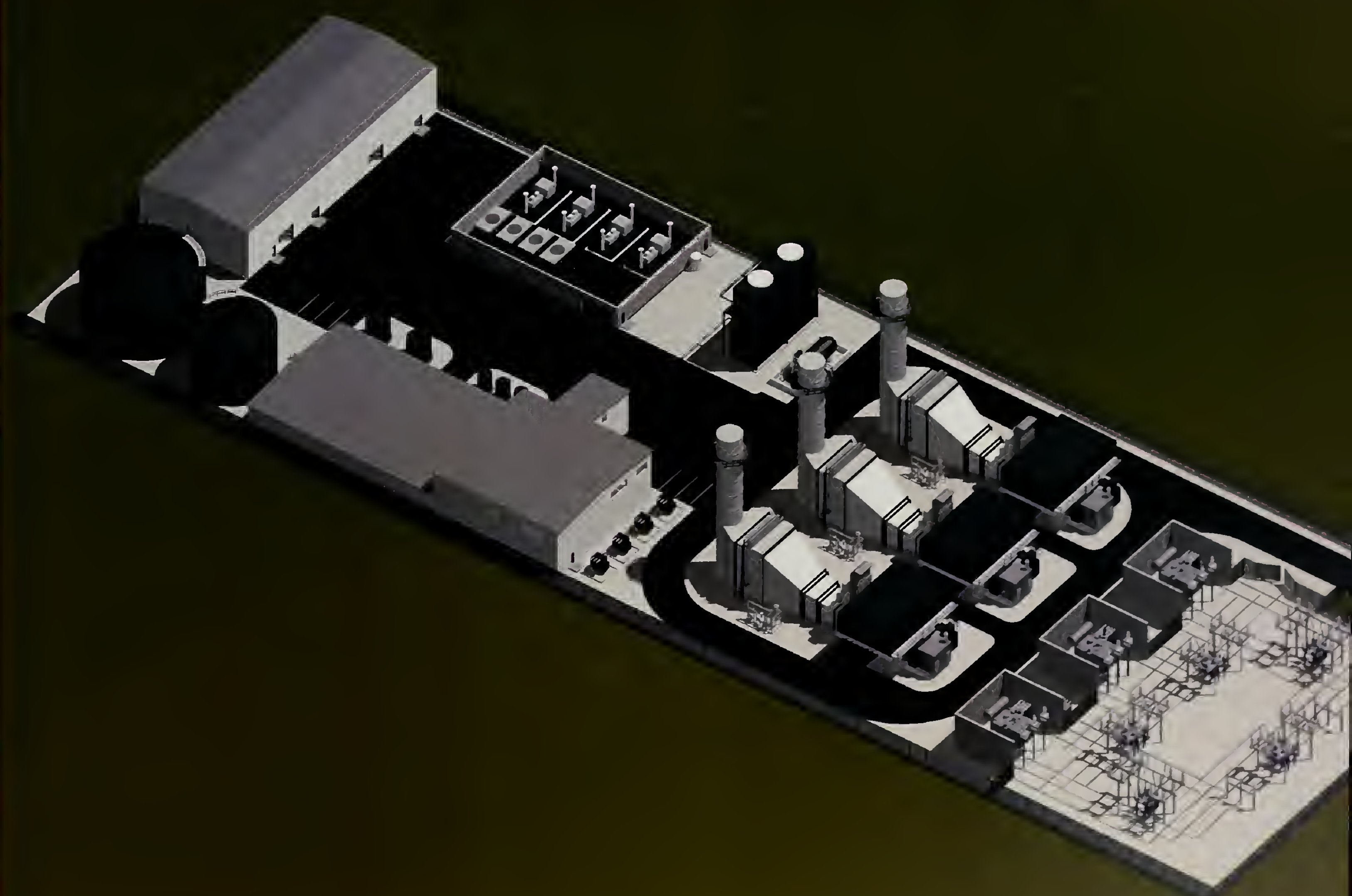
Supplement A · Vo

Application for Certification for

San Francisco Electric Reliability Project

Presented to

California Energy Commission
Sacramento, California



Applicant:

City and County of San Francisco

March 2005

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March 24, 2005

Mr. Robert Therkelsen
Executive Director
California Energy Commission
1516 Ninth Street
Sacramento, California 95814

Dear Mr. Therkelsen: Bob

The City and County of San Francisco (the "City") hereby submits this Supplement to the Application for Certification (AFC) for the San Francisco Electric Reliability Project (SFERP), Docket No 04-AFC-01, which was originally filed with the California Energy Commission on March 18, 2004. The Supplement to the AFC for the SFERP has been prepared by the City for the relocation of the project to a 4-acre site of City owned land, located near the San Francisco Bay in the Potrero District of San Francisco.

The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired, General Electric LM 6000 gas turbines and associated infrastructure. The project will employ high efficiency combustion turbine technology and selective catalytic reduction to minimize facility emissions. The project will use recycled water from an onsite treatment plant.

Construction and operation of the SFERP will facilitate the retirement of existing unreliable and highly-polluting in-City generation while maintaining the reliability of the electric system. Prior to the construction of the SFERP, completion of the Jefferson-Martin transmission project, and a number of additional transmission projects that are currently either complete or in progress, will provide for closure of the Hunters Point Power Plant. In addition, the California Independent System Operator has confirmed that construction of the SFERP, in combination with the construction of a number of planned transmission projects and the construction of a small generating facility at the San Francisco International Airport, will provide for the release of units at the Potrero Power Plant from the applicable Reliability-Must-Run (RMR) agreement. Release from the RMR agreement will eliminate a significant source of revenue for continued operation of the units and will allow Mirant Potrero, LLC to shut down the units.

The City is committed to minimizing impacts on the community in Southeast San Francisco, where the SFERP will be located. The City has procured an option for local emission reduction credits to offset NO_x emissions from the SFERP. In addition, the City is developing, with community input, a PM_{10} mitigation/community benefits package to minimize the impacts of the SFERP on residents of San Francisco.

As an official of the City and County of San Francisco, I hereby attest, under penalty of perjury, that the contents of this Supplement to the AFC are truthful and accurate to the best of my knowledge.

Sincerely,

Barbara Hale

Barbara Hale
Assistant General Manager for Power

BH/aw

Therkelsen

Final

Application for Certification for San Francisco Electric Reliability Project Supplement A – Volume 1

Submitted to

California Energy Commission

Applicant

City and County of San Francisco

March 2005

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Appendices

The following appendices are being provided with the San Francisco Electric Reliability Project (SFERP) Supplement A to the Application for Certification (AFC). They replace appendices of the same number submitted with the AFC.

The following appendices were provided in Volume 2 of the San Francisco Electric Reliability Project Application for Certification, submitted in March 2003. They have not changed from what was originally submitted. Additional copies of these appendices may be requested from the Applicant.

Acronyms and Abbreviations

°F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
ABAG	Association of Bay Area Governments
AC	alternating current
ACGIH	American Conference of Government Industrial Hygienists
ACI	American Concrete Institute
AFC	Application for Certification
AFY	acre-feet per year
AISC	American Institute of Steel Construction Code
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APCD	Air Pollution Control District
API	American Petroleum Institute
APLIC	Avian Power Line Interaction Committee
AQMD	Air Quality Management District
ASME	American Society for Mechanical Engineers
AST	aboveground storage tank
AWS	American Welding Society
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
Bay	San Francisco Bay
BayCAMP	Bayview Hunters Point Community Air Monitoring Project
BCDC	San Francisco Bay Conservation and Development Commission
BMP	best management practice
BP	years before present
CAA	Clean Air Act

CAAQS	California Ambient Air Quality Standards
CAISO	California Independent System Operator Corporation
CalARP	California Accidental Release Program
CalEPA	California Environmental Protection Agency
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control
CARB	California Air Resource Board
CAS	Chemical Abstract Service
CBC	California Building Code
CCR	California Code of Regulations
CCSF	City and County of San Francisco
CDC	California Department of Conservation
CDFG	California Department of Fish and Game
CDM	Camp Dresser & McKee
CDMG	California Division of Mines and Geology
CDOGGR	California Division of Oil, Gas, and Geothermal Resources
CDPD	Cellular Digital Pocket Data
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHP	California Highway Patrol
City	City of San Francisco
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide

County	County of San Francisco
CPUC	California Public Utilities Commission
CRT	cathode ray tube
CRSI	Concrete Reinforcing Steel Institute
CRWQCB	California Regional Water Quality Control Board
CSC	California species of special concern
CSLM	controlled low strength material
CSO	combined sewer overflow
CTG	combustion turbine generator
CUPA	Certified Unified Program Agency
CWA	Clean Water Act
DC	direct current
DCS	distributed control system
DCIS	Distributed Control and Information System
DI	deionized
DOF	California Department of Finance
DTSC	California Department of Toxic Substances Control
DWR	California Department of Water Resources
E&E	Ecology and Environment, Inc.
EAF	equivalent availability factor
EDI	electrodeionization
EHS	extremely hazardous substance
EIR	Environmental Impact Report
EMF	electric and magnetic fields
ENV	Department of the Environment
EPCRA	Emergency Planning and Community Right-To-Know Act of 1986
ERC	emission reduction credits
ERPG	Emergency Response Planning Guideline
ESCP	Erosion and Sedimentation Control Plan

ESU	Evolutionarily Significant Unit
FAA	Federal Aviation Administration
FAR	floor area ratio
Farmland	Prime Farmland, Unique Farmland, or Farmland of Statewide Importance
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FM	Factory Manual
FMMP	Farmland Mapping and Monitoring Program
FSA	Final Staff Assessment
FY	Fiscal year
g	gravity acceleration, 9.8 meters squared per second
GHz	gigahertz
$g/m^2/year$	grams per square meter per year
GO	General Order
gpd	gallons per day
gpm	gallons per minute
GW	gigawatt
GWh	gigawatt hours
HHV	higher heating value
Hg	mercury
HMBP	Hazardous Material Business Plan
HRSG	heat recovery steam generator
HSP	Health and Safety Plan
Hz	hertz
IA	Interconnection Application
IDLH	immediately dangerous to life and health
IEEE	Institute of Electrical and Electronics Engineers
I/O	input/output
IOS	International Organization for Standardization

ISO	Independent System Operator
kH	kilohertz
kV	kilovolt
kV/m	kilovolts per meter
LAER	lowest achievable emission rate
LC	load center
LD_{50}	Dose lethal to 50 percent of those tested
LDLO	lowest published lethal dose
LEL	lower explosion limit
LEPC	local emergency planning committee
LO/TO	lock-out/tag-out
LORS	laws, ordinances, regulations, and standards
mA	millamperes
MBR	Membrane BioReactor
MBtus/day	million British thermal units per day
MCC	motor control center
MCE	maximum credible earthquake
MEI	maximum exposed individual
MGD	million gallons per day
MGY	million gallons per year
mG	milligauss
MGP	manufactured gas plant
mg/kg	milligrams per kilogram
mg/m^3	milligrams per cubic meter
MHz	megahertz
mm	millimeters
MRZ	Mineral-Resource Zone
MSDS	Material Safety Data Sheet
MSW	municipal solid waste

MTC	Metropolitan Transportation Commission
MUNI	San Francisco Municipal Railway
MW	megawatt
Mw	moment magnitude
NAAMM	National Association of Architectural Metals Manufacturers
NAAQS	National Ambient Air Quality Standards
NACE	National Association for Corrosion Engineers
NESC	National Electric Safety Code
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NH_3	pure ammonia
NIOSH	National Institute of Occupational Safety and Health
NO, NO_2	nitrogen oxide gases
NO_x	oxides of nitrogen
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSR	new source review
OCA	offsite consequence analysis
OEHHA	Office of Environmental Health and Hazard Assessment
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
PG&E	Pacific Gas and Electric Company
PHGA	peak horizontal ground acceleration
PM_{10}	particulates
PMSA	Primary Metropolitan Statistical Area
POC	precursor organic compound
Port	Port of San Francisco
PP	power plant
PPE	personal protective equipment

ppm	parts per million
ppmvd	parts per million volume, dry
PPPU7	Potrero PP Unit 7
PRC	Public Resources Code
PRMMP	Paleontological Resource Monitoring and Mitigation Plan
PSD	prevention of significant deterioration
psig	pounds per square inch gauge
PSM	Process Safety Management Plan
Pub. L.	Public Law
RCRA	Resource Conservation and Recovery Act
REL	reference exposure level
RMP	Risk Management Plan
RMPP	Risk Management and Prevention Program
RMR	Reliability Must Run
RO	reverse osmosis
ROW	right-of-way
RQ	reportable quantity
RUSLE	Revised Universal Soil Loss Equation
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCADA	Supervisory Control and Data Acquisition
SCAQMD	South Coast Air Quality Management District
SCR	selective catalytic reduction
SERC	State Emergency Response Commission
SEWPCP	Southeast Water Pollution Control Plant
SEWWTP	City of San Francisco Southeast Wastewater Treatment Plant
SF_6	sulfur hexafluoride
SFBC	San Francisco Building Code
SFBRWQCB	San Francisco Regional Water Quality Control Board

SFDPH	San Francisco Department of Public Health
SFE	San Francisco Department of Environment
SFERP	San Francisco Electric Reliability Project
SFFD	San Francisco Fire Department
SFO	San Francisco International Airport
SFPD	San Francisco Police Department
SFPUC	San Francisco Public Utility Commission
SIP	State Implementation Plan
SIS	System Impact Study
SMIP	Site Mitigation and Implementation Plan
SOx	sulfur oxide
SPCC	Spill Prevention Control and Countermeasure Plan
SPRR	Southern Pacific Railroad
SSPC	Steel Structures Painting Council
STEL	short-term exposure limit, 15-min. exposure
SVP	Society of Vertebrate Paleontology
SWMP	stormwater management plan
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TDS	total dissolved solids
TPQs	Threshold Planning Quantity
TPY	tons per year
TQ	Threshold Quantity
TSP	total suspended particulate matter
UBC	Uniform Building Code
UMB	Unreinforced Masonry Building
USACE	U.S. Army Corps of Engineers
USC	U.S. Code

USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFDA	U.S. Food and Drig Administration
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
VSD	virtually safe dose
WDR	waste discharge requirement
WGNCEP	Working Group on Northern California Earthquake Potential
WPCP	Water Pollution Control Plant
WPRR	Western Pacific Railroad
WPS	water pump station

SECTION 1.0

Executive Summary

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Executive Summary

1.1 Introduction

The City and County of San Francisco (CCSF) is proposing to construct and operate a simple-cycle peaking power plant, the San Francisco Electric Reliability Project (SFERP), in San Francisco.

This Supplement to the Application for Certification (AFC) for the SFERP (referred to as Supplement A) has been prepared by CCSF for the relocation of the project site to a 4-acre site of City of San Francisco (City)-owned land, located near the San Francisco Bay in the Potrero District of San Francisco (see Figure 1-1; figures are located at the end of this section). The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired, General Electric LM 6000 gas turbines and associated infrastructure (see Figure 1-2).

The SFERP is being pursued by the City to eliminate the need for existing unreliable and highly-polluting in-City generation while maintaining the reliability of the electric system. According to the California Independent System Operator, construction of the SFERP, in combination with the construction of a number of planned transmission projects and the construction of a small generating facility at the San Francisco International Airport, will provide for the release of units at the Potrero Power Plant from the applicable Reliability-Must-Run (RMR) agreement. Release from the RMR agreement will eliminate a significant source of revenue for continued operation of the units and will allow Mirant Potrero, LLC to shut down the units. Prior to the construction of the SFERP, completion of the Jefferson-Martin transmission project, and a number of additional transmission projects that are currently either complete or in progress, will provide for closure of the Hunters Point Power Plant. The City is committed to achieving the closure of the Hunters Point and Potrero power plants as soon as possible.

The City is committed to minimizing impacts on the community in Southeast San Francisco, where the SFERP will be located. The City recognizes that the Southeast San Francisco community has been disproportionately impacted by industrial facilities including electric power generation. The SFERP will emit substantially less NO_x than existing in-City generation. Nonetheless, the City has procured an option for local emission reduction credits to offset NO_x emissions from the SFERP. In addition, although the modeling shows that the SFERP is not expected to contribute significantly to cumulative regional or localized impacts of any air pollutants, including NO_2 and PM_{10}, there will be PM_{10} impacts from the SFERP in both Potrero and Bayview/Hunters point. Also, although the impacts of toxic air contaminants from the project are below the levels considered to be significant by regulatory agencies, the City recognizes that the highest acute health hazard index from the project will be in Bayview/Hunters point. To address these concerns, the City is developing, with community input, a PM_{10} mitigation/community benefits package. The City will target the mitigation to the areas affected by the impacts from the project.

The generating units that comprise the SFERP have been made available to the City as part of a global settlement between the Williams Energy Marketing and Trading Company and a large number of parties including numerous State entities and the City. The settlement resolved claims associated with the 1999-2001 energy crisis and provided the City with four natural-gas-fired, General Electric LM 6000 turbines along with a budget for their development. The City has a power purchase agreement for sale of the output of the four turbines to the California Department of Water Resources, provided that certain conditions are met.

The SFERP, for which this Supplement is being submitted, consists of three of the units available to the City for development to be sited on City-owned land adjacent to the new MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility (the MUNI project). The City is pursuing permitting of the fourth unit at the San Francisco International Airport.

1.2 Project Overview

The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired, General Electric LM 6000 gas turbines and associated infrastructure. The project site is located near the San Francisco Bay in the Potrero District of San Francisco, on City-owned land adjacent to the new MUNI project. Approximately 4 fenced acres will be required to accommodate the generation facilities. The construction laydown area will be approximately 8.5 acres and located on land leased from a City department, the Port of San Francisco (Port). The laydown area is located directly east and adjacent to the project site between 25th and Cesar Chavez streets, and the waterfront and the SFERP site (see Figure 1-2).

The project will include the construction of a new air-insulated 115-kilovolt (kV) switchyard on the north side of the site adjacent to 25th Street. The SFERP will link to the power grid through the PG&E Potrero Substation by two redundant three-phase 115-kV solid dielectric underground transmission circuits. From the SFERP switchyard to the connection at the Potrero Substation breakers, the total transmission distance is approximately 3,000 feet.

Natural gas for the facility will be delivered through a new 900-foot-long, 12-inch diameter (or less) pipeline that will connect to PG&E's existing natural gas transmission line, which is located at the intersection of Illinois and 25th streets.

Process water for the project will be delivered from a water pump station (WPS) located on Marin Street near Cesar Chavez to a new water treatment plant located on the SFERP project site. The WPS will be located near an existing combined sewer system structure and will include three variable frequency drive pumps (two operational and one standby). A 0.76-mile-long pipeline will connect the WPS and the SFERP's onsite treatment system. This pipeline consists of two sections. The first section, approximately 1,300 feet long, will be installed within an existing collection box. The remaining section will be new construction (Figure 1-2). The onsite treatment system will be designed to produce California Code of Regulations (CCR) Title 22-quality recycled water.

Plant wastewater and reject water from the SFERP's water treatment system will be discharged into the City's combined sewer system, which routes the waste to the Southeast Water Pollution Control Plant (SEWPCP).

A general vicinity map is presented as Figure 1-1; the plant site and location of linear facilities are presented in Figure 1-2; the site plan is presented as Figure 1-3; and an oblique simulation of the plant and adjacent MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility is presented as Figure 1-4.

1.2.1 Project Objectives

The City has identified several basic objectives, consistent with the findings and recommendations contained in its Electricity Resource Plan (ERP), for the development of a power project. These objectives are:

- Facilitate the shutdown of older, more polluting in-City generation
- Minimize local impacts of electrical generation
- Maintain the City of San Francisco's electricity reliability

The City of San Francisco, PG&E, and the California Independent System Operator (CAISO) have extensively studied the electrical infrastructure in the City of San Francisco. Section 3.0 (Purpose and Need) discusses the regional electrical system in the City and why the SFERP is needed, as part of a portfolio of resources, to maintain system reliability and provide for closure of existing power plants. As that section documents, the City is committed to maximizing energy efficiency improvements, developing renewable power, encouraging clean distributed generation, and supporting needed transmission additions. Nonetheless, the siting of new, clean and operationally flexible generation is also necessary to facilitate the near-term closure of the Potrero Power Plant.

1.2.2 Project Site Selection

The criteria developed to evaluate the site's suitability correspond with the reasons the proposed site was selected. These criteria include the following:

- Environmental justice considerations
- Ensure impacts can be mitigated
- Availability of sufficient land area under City control
- Proximity to an existing substation
- Proximity to PG&E main gas pipeline
- Consistency with the General Plan and zoning ordinances, height restrictions, and existing land uses

1.3 Facility Location

The project site is located near the San Francisco Bay in the Potrero District of San Francisco, on a 4-acre site of City-owned land that is surrounded by industrial development. The site is zoned for industrial use. Development of a power plant in this area would be consistent with the zoning ordinance. The center of the SFERP site is located at approximately 37°47′7.50″ N. latitude and 122°23′0.82″ W. longitude in Township 2 S., Range 5 W. This township has

never been surveyed into sections because it was part of an original Spanish land grant. All the proposed SFERP facilities will be located within either the southernmost portion of the U.S. Geological Survey (USGS) San Francisco North or the northernmost portion of the San Francisco South 7.5′ (1:24,000-scale) standard topographic maps. The site is located on Block 474 and portions of Blocks 473, 467, and 468.

The site is near PG&E's 115-kV Potrero Substation. The existing substation has sufficient transmission capacity to serve a new 145-MW plant. Natural gas would be supplied to the new power plant from the PG&E main located at the corner of Illinois and 25th streets. Additional natural gas compressors would be necessary to serve the new plant. Water supply for the proposed plant would be obtained from the City's combined sewer system via a pumping station, a pipeline, and an onsite primary, secondary, and tertiary recycled water treatment system that will produce CCR Title 22-quality recycled water. Wastewater from the plant would be returned to the City's combined sewer system.

The plant would be located in an industrial area of San Francisco and would be screened by structures to be constructed as part of the MUNI project. The nearest dwelling units to the project, which are potentially sensitive noise receptors, are located approximately 1,600 feet from the project.

Block and lot numbers and the names of the landowners within 1,000 feet of the site and within 500 feet of the linear corridors are included in Appendix 1A.

1.4 Project Schedule

Construction of the generating facility, from site preparation and grading to commercial operation, is expected to take approximately 12 months. Major milestones are listed in Table 1-1.

TABLE 1-1
Project Schedule Major Milestones

Activity	Date
Begin Construction	2nd Quarter 2006
Startup and Test	2nd Quarter 2007
Commercial Operation	2nd Quarter 2007

The site will be accessed for construction via either 25th or Cesar Chavez and Maryland streets. Normal construction will be scheduled between 7 a.m. and 8 p.m., Monday through Friday. During the startup phase of the project, some activities will continue 24 hours per day, 7 days per week.

1.5 Project Ownership

The power plant and transmission lines will be owned and operated by CCSF. Consistent with PG&E practice and California Public Utilities Commission (CPUC) law and regulation,

the natural gas pipeline will be owned by PG&E. The potable water and process water lines will be owned by CCSF.

The initial capital cost of the SFERP is estimated to be $140 million. The estimated value of materials and supplies that will be purchased locally (within San Francisco) during construction is between $2 and $3 million.

1.6 Project Alternatives

The CEC conducts its review of alternatives to satisfy the Warren-Alquist Act and the California Environmental Quality Act (CEQA). Appendix B(f)(1) of the CEC Guidelines requires a discussion of the range of reasonable alternatives to the project, or to the location of the Project, which would feasibly attain most of the basic objectives of the Project but would avoid or substantially lessen any of the significant effects of the Project. To enable this review, the criteria and objectives that led to the selection of the site and design features of the proposed SFERP are provided, along with a detailed discussion of the range of alternatives considered (see Section 9.0, Alternatives).

A "No Project" alternative was considered and rejected as inconsistent with the City's objectives. Development of new power generation facilities will allow closure of existing, dirty generation facilities that impact low income/minority communities and will improve local electric reliability.

1.7 Environmental Justice

The City recognizes that Southeast San Francisco is a community of color with relatively high rates of serious respiratory diseases and that the Southeast San Francisco has been disproportionately impacted by industrial facilities. To address these concerns, Ordinance 124-01 sets forth requirements for any new fossil-fueled power generation at the Potrero Hill Power Plant in Southeast San Francisco. Although the SFERP is no longer proposed to be sited at the Potrero Hill Power Plant, Ordinance 124-01 still provides general policy guidance about the City's objectives for the development of generation in Southeast San Francisco. The SFERP supports the objectives of Ordinance 124-01 by reducing emissions of NO_x, and facilitating the closure of the Potrero Power Plant. In addition, the City is committed to developing a meaningful PM_{10} mitigation/community benefits package to mitigate the adverse impacts of the SFERP on the community. Although the modeling shows that the SFERP is not expected to contribute significantly to cumulative regional or localized air quality impacts of any air pollutant, including NO_2 and PM_{10}, there will be PM_{10} impacts from the SFERP in both Potrero and Bayview/Hunters Point. Also, although the impacts of toxic air contaminants from the project are below the levels considered to be significant by regulatory agencies, the City recognizes that the highest acute health hazard index from the project will be in Bayview/Hunters Point. The City will target the mitigation to the areas affected by the impacts from the project.

1.8 Environmental Considerations

Sixteen different types of possible environmental impacts from the proposed project were investigated in preparing this Supplement. Detailed descriptions and analyses of these issues are presented in Subsections 8.1 through 8.16. This section briefly summarizes the potential effects typically of greater interest to CEC staff and the public.

1.8.1 Air Quality

The site is located in an area designated as nonattainment for State and federal ozone air quality standards, and for State fine particulate matter (PM_{10}) standards. An assessment of the impact to air quality was performed using detailed air dispersion modeling. The air impacts from the Project will be mitigated by the use of state-of-the-art combustion turbine emission control technology. The City has obtained an option to procure sufficient local emission reduction credits (ERCs) to meet the offset requirements for this project. The option is for sufficient ERCs to offset on a one-to-one basis increases in emissions of precursor organic compounds (POCs) and NO_x (both precursors of ozone). In addition, the City, with community input, is developing a PM_{10} mitigation and community benefits plan. See Subsection 8.1, Air Quality, for a detailed analysis of air quality.

1.8.2 Water Resources

Water for the SFERP for process and cooling, equipment wash and the dual plumbing system (toilets) will be recycled water produced on the site at a new water treatment system included as part of the project. The City will provide wastewater from a process water pumping station to be constructed on Marin Street near Cesar Chavez Street, about 0.76 mile from the site. The pipeline consists of two parts. Approximately 1,300 feet of the pipeline will be installed within an existing collection box. The remaining portion will be new construction (see Figure 1-2).

The onsite treatment system will be designed to produce Title 22-quality recycled water, with the treatment system providing primary, secondary, and tertiary treatment plus disinfection either by ultraviolet system or chlorination. Potable water will be provided for fire protection, domestic uses, and emergency backup for cooling and process needs.

1.8.3 Visual Resources

The proposed project features will change the existing landscape from a site that is mostly undeveloped (the exception is the existing temporary cement plant that will be removed prior to project construction) to a paved site with several onsite buildings and electrical generation and transmission structures. Three 85-foot-tall stacks will be the tallest project features at the site. The exteriors of all project elements will be treated with a neutral gray finish that will optimize visual integration with the surrounding environment. With project implementation, much more of the site will be occupied with equipment than is currently the case, and the site, when viewed from adjacent parcels, will appear more orderly and maintained than it does now.

Although the proposed power plant is a peaking unit, it could be operated 24 hours per day, 7 days per week for periods of time. Its operation would require onsite nighttime lighting for safety and security. To reduce offsite lighting impacts, lighting at the facility would be

restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits would be provided, thus allowing these areas to remain dark at most times, minimizing the amount of lighting potentially visible offsite.

1.8.4 Noise

While the proposed SFERP will produce noticeable noise, the noise levels will be in compliance with San Francisco's Noise Ordinance requirements for industrial properties. Noise will also be produced at the site during the construction phase of the project. The construction noise may be audible at the nearest dwelling units but is not anticipated to exceed current exposure levels and the noisiest construction activities will be confined to the daytime hours.

1.9 Key Benefits

1.9.1 Closure of In-City Generation and Reliability

Construction of the SFERP, in combination with the construction of a number of planned transmission projects and the construction of a small generating facility at the San Francisco International Airport, will provide for the release of units at the Potrero Power Plant from the applicable RMR agreement. Release from the RMR agreement will eliminate a significant source of revenue from continued operation of the units and allow Mirant Potrero LLC to shut down the units. The City is committed to securing the closure of the Potrero Power Plant through negotiations with Mirant or other means. Prior to the construction of the SFERP, completion of the Jefferson-Martin transmission project and a number of additional transmission projects that are currently either complete or in progress will provide for closure of the Hunters Point Power Plant. The SFERP complements the City's efforts to promote energy efficiency, renewable resources, and clean distributed generation.

1.9.2 Environmental

SFERP will employ advanced, high-efficiency combustion turbine technology and selective catalytic reduction (SCR) to minimize emissions from the facility. Project NO_x emissions will be as much as 85 percent lower than those for existing older peaking facilities in the City. The City has obtained options for local emission offsets to compensate for the air emissions. The City is also developing a PM_{10} mitigation plan. The City will target the mitigation to the areas by the impacts from the project.

Recycled water will be used for plant cooling and process water needs. This will allow for industrial reuse of wastewater and will minimize the amount of potable water required.

1.9.3 Local Control and Employment

The SFERP will provide for local control over, and accountability with regard to, a strategically located new resource.

The workforce on the project during construction will peak at approximately 264 people, including construction craft persons and supervisory, support, and construction management personnel. In addition, it would provide approximately 11 full-time, living-wage jobs throughout the life of the plant.

1.9.4 Energy Efficiency

SFERP will be an efficient, environmentally responsible source of reliable peaking energy to serve the growing energy demands of the City. SFERP will help ensure reliable, clean electricity in the future.

1.10 Persons Who Prepared the Supplement

Persons with primary responsibility for the preparation of each section of this Supplement are listed in Appendix 1B.

1.11 Permitting Requirements

Each section provides a list of applicable federal, state, and local permits that would be required by each jurisdiction for the project.

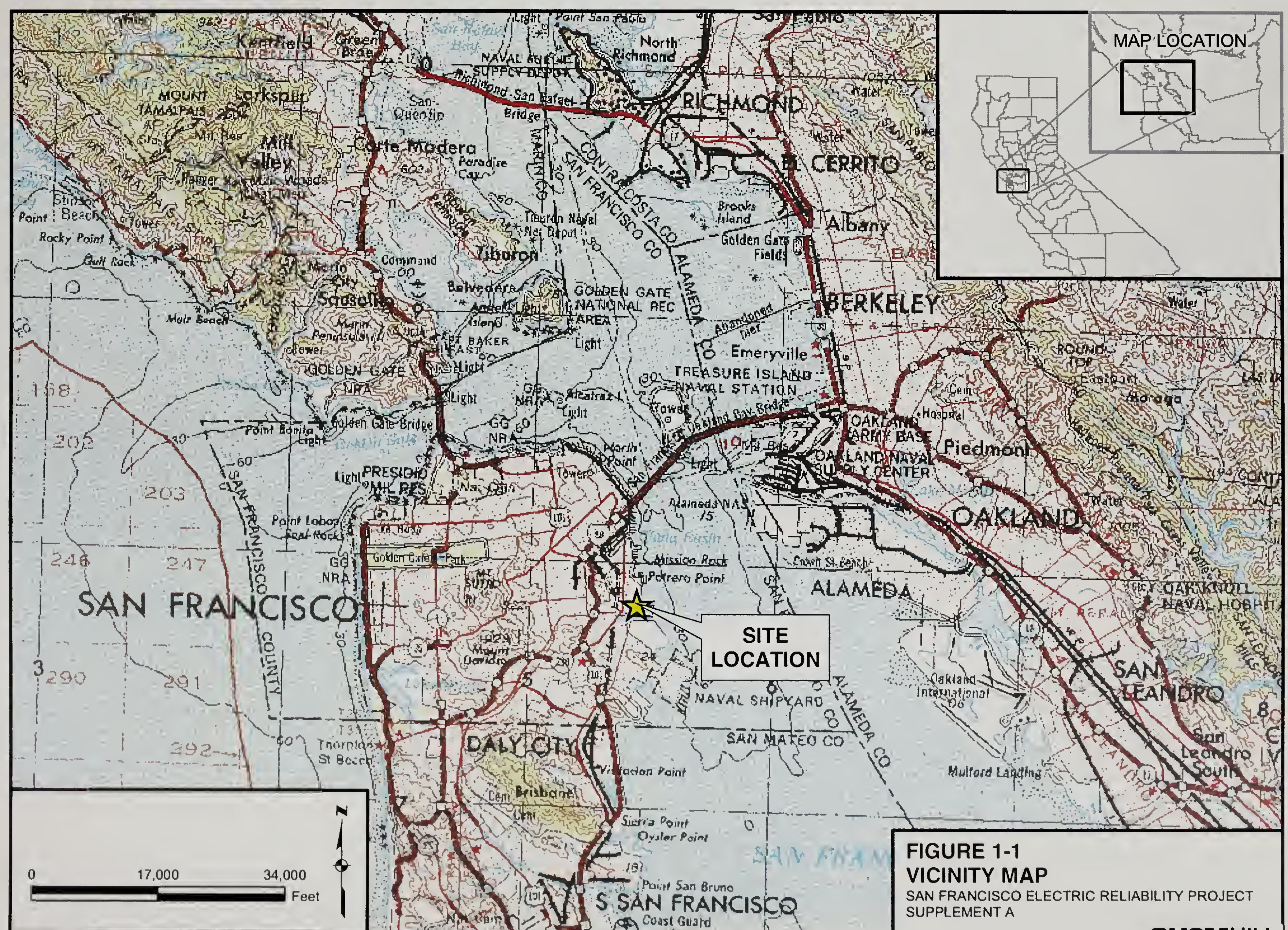

FIGURE 1-1
VICINITY MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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FIGURE 1-2
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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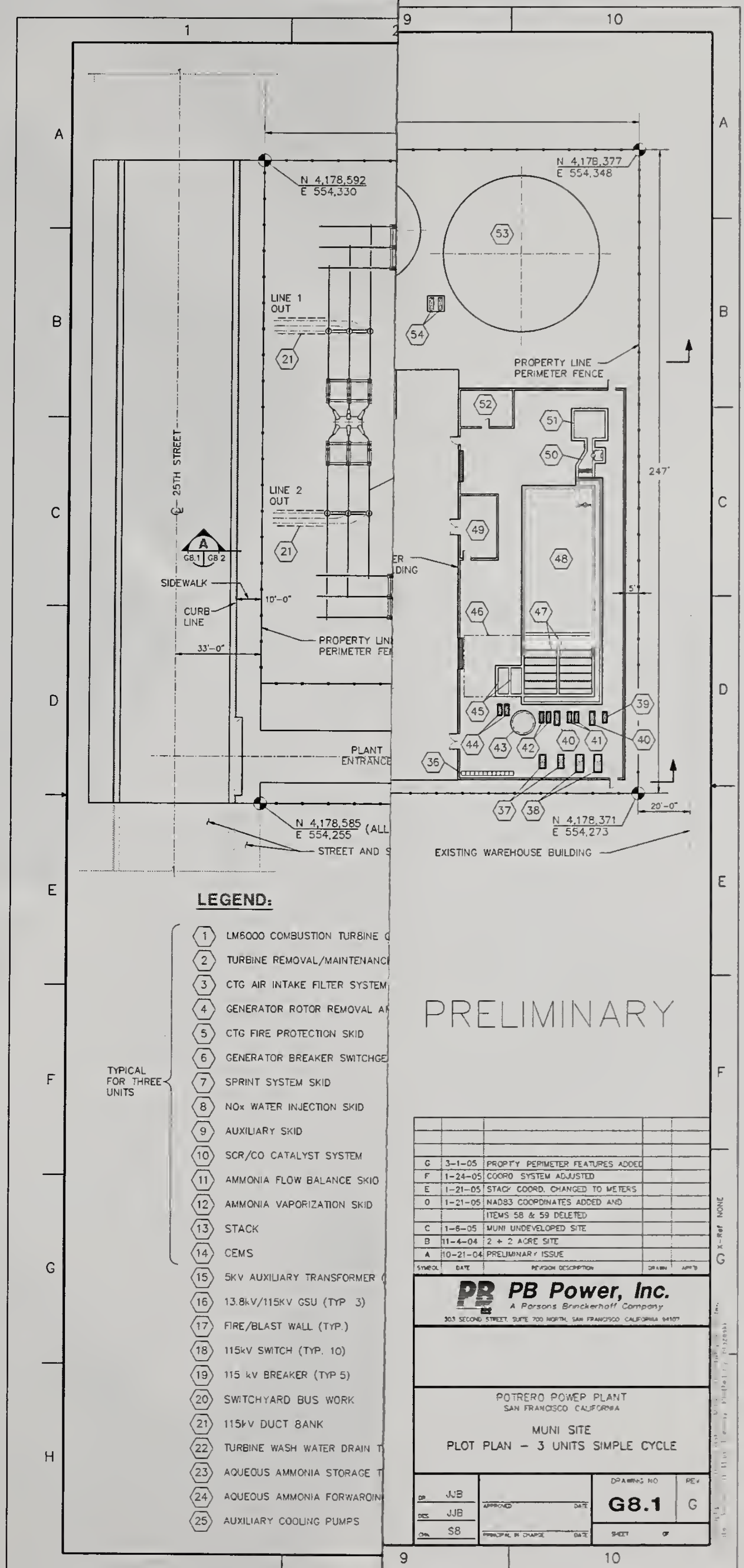

FIGURE 1-3
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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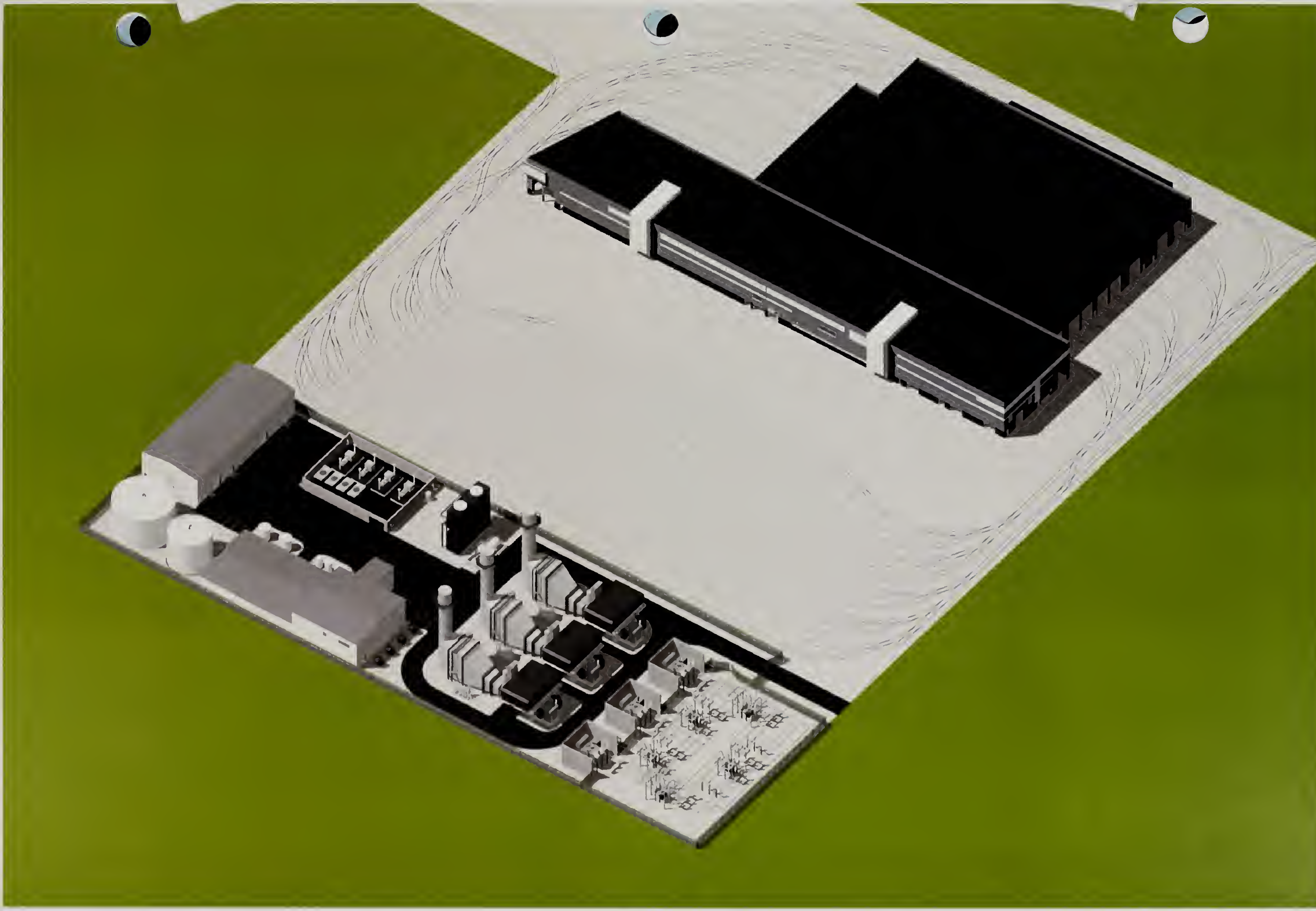

FIGURE 1-4
OBLIQUE VIEW OF PROJECT AND MUNI FACILITY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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SECTION 2.0

Project Description

SECTION 2.0

Project Description

The City of San Francisco (City) is proposing to construct and operate a simple-cycle power plant, the San Francisco Electric Reliability Project (SFERP), in the City and County of San Francisco (CCSF).

2.1 Introduction

The SFERP will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired General Electric LM 6000 gas turbines and associated infrastructure. The project site is located near the San Francisco Bay in the Potrero District of San Francisco, on a 4-acre site of City-owned land (see Figure 2-1).

The project will include the construction of a new air-insulated 115-kilovolt (kV) switchyard on the north side of the site adjacent to 25th Street. PG&E is currently performing a Facilities Study to evaluate whether the SFERP circuits will enter the switchyard underground from Illinois Street or continue north to 22nd Street. The circuits would then run east in 22nd Street to an underground/overhead transition structure located on the eastern portion of the Potrero switchyard. This overhead line would then connect with the switchyard bus in an overhead arrangement. Electrical generation will be at 13.8 kV, which will be stepped up with 115-kV step-up transformers.

A pipeline tie-in will be made to the existing PG&E natural gas transmission line at the intersection of Illinois and 25th streets. Natural gas for the facility will be delivered through a new 900-foot-long, 12-inch-diameter (or less) pipeline. This service will be connected to a booster compressor station that will be part of the SFERP facility. Process water for the project will be obtained via a water pump station (WPS) located on Marin Street near Cesar Chavez Street which will connect to a new recycled water plant located on the southern portion of the project site.

The City will provide wastewater effluent for the onsite recycled water treatment. The WPS will be located in an existing combined sewer system structure and will include three variable frequency drive pumps (two operational and one standby). A seven-tenths-of-a-mile long pipeline will connect the WPS and the SFERP's onsite recycled water treatment system. The seven-tenths of a mile-long pipeline consists of two sections. Approximately 1,300 feet of the pipeline will be installed within an existing collection box. The remaining section will be new construction (Figure 2-1; all figures appear at the end of this section). The onsite treatment system will be designed to produce Title 22 quality recycled water for industrial use at the SFERP.

Plant wastewater and reject water from the SFERP wastewater treatment system will be discharged into the City's combined sewer system, which routes the waste to the City of San Francisco Southeast Water Pollution Control Plant (SEWPCP).

Stormwater will be collected onsite during operations and will be directed to the stormwater collection system at the adjacent MUNI Metro East site. Their system then discharges the stormwater into the combined sewer system.

The plant's design will incorporate air pollution emission controls designed to meet the best available technology stringent standards required by the State and the Bay Area Air Quality Management District. These controls will include water injection for combustion control of nitrogen emissions, a selective catalytic reduction system (SCR) for post combustion control oxides of nitrogen emissions, and an oxidation catalyst system to control carbon monoxide and precursor organic compound emissions.

Site access will be provided via 25th Street at the northern side of the plant site. The plant will be accessed from 25th Street via Illinois Street, with vicinity access via Interstate 280 (I-280).

The site for SFERP is approximately 4.0 acres of City-owned property. The San Francisco Public Utilities Commission (SFPUC) is pursuing a memorandum of understanding, based on a signed letter of intent for an option to transfer the beneficial use of the property from the Municipal Transportation Agency (MUNI), another City department, to the SFPUC. The memorandum of understanding will be subject to approval by MUNI's Board of Directors, the Public Utilities Commission and the San Francisco Port Commission. The SFPUC intends to obtain these approvals within the next two months. Additional information on location is presented in Section 1.

The following sections describe the design and operation of the project and the associated electric transmission line, natural gas supply line, and water lines. Site selection and the alternative sites considered are presented in Section 9, Alternatives.

2.2 Project Description, Design, and Operation

This section describes the facility's conceptual design and proposed operation.

2.2.1 Site Plan and Access

The site arrangement shown in Figure 2-2 and the typical elevation views presented in Figure 2-3 illustrate the location and size of the proposed facility. Approximately 4.0 fenced acres will be required to accommodate the generation facilities. The construction laydown area will be approximately 8.5 acres and located on land leased from the Port of San Francisco. The laydown area is located directly east and adjacent to the project site between the project site and the waterfront (see Figure 2-1).

The plant site has been cleared of all permanent structures. Currently, there are some temporary facilities on the property including construction trailers, a construction laydown area and a cement batch plant. The temporary facilities will be removed prior to the construction of the SFERP.

2.2.2 Process Description

The project will consist of three General Electric LM 6000 gas combustion turbine generators (CTGs) equipped with water injection to control oxides of nitrogen (NO_x) emissions, and

power augmentation. SCR will be used for further NO_x control. An oxidation catalyst and associated support equipment are also provided.

Each CTG will generate a nominal 48 MW with the use of chillers. The project is expected to have an overall annual availability approaching 100 percent. The heat and water balances for the facility are shown in Figures 2-4 and 2-5.

Associated equipment will include a 2-cell cooling tower for the inlet air chillers and emission control systems necessary to meet the proposed emission limits. NO_x emissions will be controlled to 2.5 parts per million by volume, dry (ppmvd) basis corrected to 15 percent oxygen by a combination of water injection in the CTGs and SCR systems in the exhaust stack transition. Carbon monoxide (CO) will be controlled to 4 ppmvd at 15 percent oxygen in the CTG combustors with an oxidation catalyst system. Precursor organic compound (POC) emissions will be controlled to 2 ppmvd at 15 percent oxygen.

2.2.3 Plant Cycle

CTG combustion air will flow through the inlet air filters and chiller coils (and associated air inlet ductwork), be compressed, and then flow to the CTG combustion sections. Natural gas fuel will be injected into the compressed air in the combustion sections and ignited. The hot combustion gases will expand through the turbine sections of the CTGs, causing them to rotate and drive the electric generators and CTG compressors. The hot combustion gases will exit the turbine sections, enter a transition that will house the SCR and oxidation catalyst systems, and exit to the atmosphere through the exhaust stacks.

2.2.4 Combustion Turbine Generators

Thermal energy will be produced in the three CTGs through the combustion of natural gas, which will be converted into the mechanical energy required to drive the combustion turbine compressors and electric generators. Three aeroderivative CTGs have been selected for the project. General Electric will supply these CTGs. The aeroderivative technology is the most efficient simple-cycle CTG on the market and has a documented availability record of 97.8 percent. The construction and commissioning process for the plant will take approximately 12 months.

Each CTG system will consist of a CTG with supporting systems and associated auxiliary equipment. The CTGs will have water injection for controlling NO_x emissions and for power augmentation; CTG exhaust emissions will be further reduced through the use of SCR and oxidation catalyst systems.

The CTGs will be equipped with the following required accessories to provide safe and reliable operation:

- Inlet air chilling
- Inlet air filters
- Metal acoustical enclosure
- Lube oil cooler
- Water injection system
- Turbine enclosure vent fans
- Generator enclosure vent fans

- Fire detection and protection system

Inlet combustion air will be cooled via a chilled water system to increase turbine performance during high ambient conditions. The combustion turbine also will have water injection spray evaporative intercooling between the low-pressure and the high pressure compressor sections to increase CTG performance. Water injection into the CTG combustor will be used to suppress flame temperature and thereby control NO_x emissions at the outlet of the CTG.

The exhaust stack transition will be equipped with a post combustion control system that will use ammonia vapor in the presence of a selective catalyst, commonly referred to as an SCR system, to further reduce the NO_x concentration in the exhaust gases. The catalyst module will be located between the CTG exhaust gas transition section and the exhaust stack base. Diluted ammonia vapor (NH_3) will be injected into the exhaust gas stream through a grid of nozzles located upstream of the catalyst module. The subsequent chemical reaction will reduce NO_x to nitrogen and water, resulting in a NO_x concentration of no more than 2.5 ppmvd at 15 percent oxygen in the exhaust gas. The exhaust stack transition will also include an oxidation catalyst system, which will control CO emissions to 4 ppmvd. POC emissions will be controlled to less than 2 ppmvd. The oxidation catalyst system will be located in the ductwork between the CTG and the SCR system.

2.2.5 Major Electrical Equipment and Systems

2.2.5.1 AC Power—Transmission

Three CTGs will generate electricity at 13.8 kV. An overall single-line diagram of the facility's electrical system is shown in Figure 2-6. The three 13.8-kV generator outputs will be connected by generator bus to individual oil-filled generator step-up transformers, which will increase the voltage to 115-kV. Surge arresters will be provided at the high-voltage bushings to protect the transformers from surges on the 115-kV system caused by lightning strikes or other system disturbances. The transformers will be set on concrete pads within containment systems designed to contain the transformer oil (non-polychlorinated biphenyl [PCB]) in case of a leak or spill. Rated fire barriers will be used to separate critical equipment and to provide fire protection. The high voltage side of each step-up transformer will be connected to an open air 115-kV switchyard located on the project site. An HV underground transmission line will connect to PG&E's Potrero 115-kV Substation. The switchyard will be configured in a highly reliable scheme, as detailed in Section 5.0.

2.2.5.2 AC Power—Distribution to Auxiliaries

Auxiliary power to the combustion turbine power block will be supplied at 4,160 volts alternating current (AC) by a double-ended 4,160-volt (4.16 kV) switchgear lineup. Two non-PCB oil-filled 115 to 4.16-kV station service stepdown transformers will supply primary power to the switchgear.

The 4,160-volt switchgear lineup will supply power to the CTG inlet chiller compressor motors, the natural gas compressors, and to the load center (LC) transformers, and will be rated at 4,160 to 480 volts for 480-volt power distribution.

2.2.5.3 DC Power Supply

Each CTG is equipped with 125-volts direct current (DC) battery/charger systems for its package control system and an on-board fire protection system. The required 480-volt AC power supply will be provided from the associated motor control center (MCC) for each CTG.

One common DC power supply system consisting of a 125-volt DC battery, two 100 percent 125-volt DC full-capacity battery chargers, metering, ground detectors, and distribution panels will be supplied for the balance-of-plant.

Under normal operating conditions, the battery chargers will supply DC power to the DC loads. The battery chargers will receive 480-volt, three-phase AC power from the AC power supply (480-volt) system and continuously charge the batteries while supplying power to the DC loads. The ground detection scheme will detect grounds faults on the DC power supply system.

Under abnormal or emergency conditions, when power from the AC power supply (480-volt) system is unavailable, the battery will supply DC power to the DC loads. Recharging of a discharged battery will occur whenever 480-volt power becomes available from the AC power supply (480-volt) system. The rate of charge will depend on the characteristics of the battery, battery charger, and connected DC load during charging. The anticipated maximum recharge time will be 24 hours.

The 125-volt DC system will also be used to provide control power to the 4,160-volt switchgear, to the 480-volt LCs, and to critical control circuits.

2.2.5.4 Essential Service AC Uninterruptible Power Supply

The combustion turbine power block will also have an essential service 120-volt AC, single-phase, 60-hertz (Hz) power source. This source will supply AC power to essential instrumentation, to critical equipment loads, and to unit protection and safety systems that require uninterruptible AC power. The essential service AC system and DC power supply system will be designed to ensure that critical safety and unit protection control circuits have power and can take the correct action on a unit trip or loss of plant AC power.

The essential service AC system will consist of one full-capacity inverter, a solid-state transfer switch, a manual bypass switch, an alternate source transformer and voltage regulator, and an AC panel board.

The normal source of power to the system will be the DC power supply system through the inverter to the panel board. A solid-state static transfer switch will monitor the inverter output and the alternate AC source continuously. The transfer switch will automatically transfer essential AC loads without interruption from the inverter output to the alternate source upon loss of the inverter output.

A manual bypass switch will also be included to enable isolation of the inverter-static transfer switch for testing and maintenance without interruption to the essential service AC loads.

2.2.6 Fuel System

The CTGs will be designed to burn natural gas. Maximum natural gas requirements during operation are approximately 35,150 million British thermal units per day (MBtus/day) higher heating value (HHV) basis.

The pressure of natural gas delivered to the site via PG&E is expected to be approximately 110 pounds per square inch gauge (psig). The natural gas will be boosted to approximately 690 psig by onsite compressors, and then flow through a gas pressure control station and gas scrubber/filtering equipment, before entering the combustion turbines.

2.2.7 Water Supply and Use

This section describes the quantity of water required and the use of the water supply.

2.2.7.1 Water Requirements

Water consumption includes a cooling tower makeup for cooling from the following heat rejection sources: CTG lube oil system, inlet air chiller condenser, and other minor sources. Additional makeup water is fed to the water treatment system for use in NO_x suppression injection and compressor evaporative cooling. The project's expected peak water consumption is about 362 gallons per minute (gpm) based on full load operation on a hot day. At this rate, total daily peak water use is about 520,000 gallons per day (gpd), based on 24 hours of operation at the sustained peak hourly temperature.

Generation of demineralized water is required to operate the CTG water treatment system. Water filtration and demineralization equipment will be provided to produce and store deionized (DI) water for distribution to the turbines, as required.

2.2.7.2 Water Supply

Approximately 57 percent of the total water requirements for the project will be for water injection to control NO_x emissions and compressor evaporative cooling. The balance of the water will be used in the cooling towers as makeup, for cooling tower blowdown, and for reject from the water treatment system. Process water will be supplied via a WPS located on Marin Street near Cesar Chavez Street. The WPS will convey process water to the new SFERP recycled water treatment system.

2.2.7.3 Water Treatment

Process water will be provided to the SFERP via a 0.76-mile-long underground pipeline, where it will be treated to Title 22 recycled water standards by an onsite treatment system that will include primary, secondary, and tertiary treatment. The primary treatment of the process supply water will be accomplished by use of a traveling band screen constructed of stainless steel perforated plates. Solids will be sluiced from the screen by a water wash system and will be returned to the combined sewer system located in 23rd Street. The secondary treatment will be achieved in an anoxic/aerobic tank to ensure proper biological activity. After the appropriate hydraulic retention time, the water will flow into the tertiary treatment system. The tertiary treatment and filtering will be achieved by incorporation of a Membrane BioReactor (MBR) (Zenon or other similar process). An aerobic zone is created and scouring of the membrane fibers is achieved by the introduction of scouring air through

a series of diffusers. The filtered permeate will then be disinfected with an ultraviolet or chlorinated system, depending upon the final design parameters. The recycled water will then be pumped to the recycled water storage tank for use within the plant for all non-potable water applications. A small waste stream containing the MBR-collected solids will be sent to the combined sewer located in 23rd Street. All equipment open to the atmosphere will be vented through an activated carbon collection system to control odors.

The treated water will be divided into supply for the cooling towers and supply for NO_x suppression injection and compressor evaporative cooling. Cooling water treatment may require the addition of chemicals such as a pH control agent (acid or caustic), a mineral scale dispersant (e.g., polyacrylate polymer), a corrosion inhibitor (phosphate based), and a biocide (hypochlorite or equivalent). No chromium-based additives will be used in the cooling water.

The water to be used for NO_x suppression injection and compressor evaporative cooling will be treated with a reverse osmosis (RO) system. The RO product, or permeate, is then fed to an electrodeionization (EDI) system to reduce any remaining ions to the required concentrations for feed into the turbine. Product water from the EDI system will be stored in the DI water storage tank.

Discharges from the water treatment processes and plant wastewater will be sent to the SEWPCP via the combined sewer system.

2.2.8 Plant Cooling Systems

The heat rejection system will consist of a single two-cell wet counter flow cooling tower to remove the heat generated by the turbine inlet chillers and the heat generated by miscellaneous auxiliary heat loads such as lube oil coolers. The cooling tower cells will use treated water as makeup and will have a continuous blowdown to maintain basin dissolved solids in the range of 5 cycles of concentration.

2.2.9 Waste Management

Waste management is the process whereby all wastes produced at the plant will be collected, treated if necessary, and disposed of properly. Wastes will include waste lubricating oils and oily rags. Waste management is discussed in more detail in Subsection 8.13.

2.2.9.1 Solid Waste

The project will produce minimal maintenance and plant wastes typical of power generation operations. An outside contractor will remove all generated wastes to the contractor's establishment for ultimate disposal. Generation plant wastes include: oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers.

2.2.9.2 Hazardous Wastes

Several methods will be used to properly manage and dispose of hazardous wastes generated by the project. Waste lubricating oil will be recovered and recycled by a waste

oil-recycling contractor. Spent lubrication oil filters will be disposed of by the maintenance contractor in a Class I landfill. Spent SCR catalysts will be recycled by the supplier.

2.2.9.3 Wastewater Discharge

Wastewater from the water treatment process, cooling/process water blowdown, and sanitary sewer discharges will be sent to the SEWPCP via the combined sewer system. The interconnection to the combined sewer system will be located in Cesar Chavez Street, on the south side of the project site.

2.2.10 Management of Hazardous Materials

There will be a variety of chemicals stored and used during construction and operation of SFERP. The storage, handling, and use of all chemicals will be conducted in accordance with applicable laws, ordinances, regulations, and standards (LORS). Chemicals will be stored in appropriate chemical storage facilities, bulk chemicals will be stored in storage tanks, and most other chemicals will be stored in returnable delivery containers. Chemical storage and chemical feed areas will be designed to contain leaks and spills. Berm and drain piping design will allow a full-tank capacity spill without overflowing the berms. For multiple tanks located within the same bermed area, the capacity of the largest single tank will determine the volume of the bermed area and drain piping. Drain piping for volatile chemicals will be trapped and isolated from other drains to eliminate noxious or toxic vapors. After neutralization, if required, water collected from the chemical storage areas will be directed to the cooling tower basin.

A 29 percent solution of aqueous ammonia will be stored in a tank with a containment basin and collection sump.

Portable safety showers and eyewashes will be provided adjacent to the ammonia storage tank area. Maintenance personnel will use state-approved, personal protective equipment (PPE) during chemical spill containment and cleanup activities. Personnel will be properly trained in the handling of these chemicals. Visual and audible alarms will alert SFERP personnel and personnel at the adjacent MUNI facility in the event of an ammonia spill. Training will also be provided to SFERP personnel and personnel at the adjacent MUNI facility on the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material will be stored onsite for spill cleanup.

Electric equipment insulating materials will be specified to be free of PCBs.

A list of the chemicals anticipated for use at the facility is provided in Subsection 8.12, Hazardous Materials Handling. Table 8.12-3 identifies each chemical by type and intended use and estimates the quantity to be stored onsite. Subsection 8.12 includes additional information on hazardous materials handling.

2.2.11 Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs will be controlled using state-of-the-art systems. Subsection 8.1, Air Quality, includes additional information on emission control and monitoring, which is summarized below. The air emission rates for the CTGs are summarized in Subsection 2.2.15, Facility Operation.

2.2.11.1 NO_x Emission Control

Water injection and SCR will be used to control NO_x concentrations in the exhaust gas emitted to the atmosphere to 2.5 ppmvd at 15 percent oxygen from the gas turbines. The SCR process will use a 29 percent solution of aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the exiting exhaust gas, will be limited to 10 ppmvd at 15 percent oxygen. The SCR equipment will include a reactor chamber, catalyst modules, ammonia storage system, ammonia vaporization and injection system, and monitoring equipment and sensors.

2.2.11.2 CO and POC Emission Control

CO will be controlled at the CTG combustor with state-of-the-art combustion technology and the use of an oxidation catalyst system. POC emissions will be controlled with advanced combustion controls and the oxidation catalyst system.

2.2.11.3 Particulate Emission Control

Particulate emissions will be controlled using good combustion controls and natural gas as the sole fuel for the CTGs.

2.2.11.4 Continuous Emission Monitoring

A monitoring system will record fuel gas flow rate and monitor the emissions of NO_x, CO, and oxygen in the exhaust gas. This system will generate reports of emissions data in accordance with permit requirements and will send alarm signals to the control room when the level of emissions approaches or exceeds pre-selected limits.

2.2.12 Plant Auxiliaries

The following systems will support, protect, and control the generating facility.

2.2.12.1 Lighting

The lighting system will provide maintenance personnel with illumination under normal conditions. As the generation equipment is located inside a metal enclosure with wide access doors, egress under emergency conditions will not require emergency lighting. The system also will provide 120-volt convenience outlets for portable lamps and tools.

2.2.12.2 Grounding

The electrical system will be susceptible to ground faults, lightning, and switching surges that can result in high voltage—a potential hazard to site personnel and electrical equipment. The station grounding system will provide an adequate path to permit the dissipation of current created by these events.

2.2.12.3 Distributed Control and Information System

The Distributed Control and Information System (DCIS) will provide modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The following functions will be provided:

- Controlling the CTGs and other systems in a coordinated manner
- Controlling the balance-of-plant systems in response to plant demands

- Monitoring controlled plant equipment and process parameters and delivering this information to plant operators
- Providing control displays (printed logs, flat panel displays) for signals generated within the system or received from input/output [I/O])
- Providing consolidated plant process status information through displays presented in a timely and meaningful way
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm CRT(s), and recording on an alarm log printer
- Storing and retrieving historical data

The DCIS will be a redundant microprocessor-based system consisting of the following major components:

- CRT-based operator consoles
- Engineer work station
- Distributed processing units
- I/O cabinets
- Historical data unit
- Printers
- Data links to the combustion turbine and steam turbine control systems

2.2.12.4 Cathodic Protection

The cathodic protection system will be designed to control the electrochemical corrosion of designated metal piping buried in the soil. Depending upon the corrosion potential and the site soils, either passive or impressed current cathodic protection will be provided.

2.2.13 Interconnect to Electrical Grid

Each of the three CTGs will be connected to a 3-phase step-up transformer, which will be connected to the plant's 115-kV switchyard. The switchyard will consist of an open air switchyard arranged in the highly-reliable scheme with appropriate disconnect switches, circuit breakers, and grounding switches. From the switchyard, the generated power will be transmitted into PG&E's Potrero 115-kV Substation via underground 115-kV transmission lines. See Section 5.0 for additional information on the switchyard and connection to the PG&E transmission system.

2.2.14 Project Construction

Construction of the generating facility—from site preparation and grading, to commercial operation—is expected to take approximately 12 months. Major milestones are listed in Table 2-1.

TABLE 2-1
Project Schedule Major Milestones

Activity	Date
Begin Construction	Second Quarter 2006
Startup and Test	Second Quarter 2007
Commercial Operation	Second Quarter 2007

The site will be accessed for construction via either 25th or Cesar Chavez and Maryland streets.

The workforce on the project during construction will be approximately 264 people, including construction craft persons and supervisory, support, and construction management personnel (see Subsection 8.8, Socioeconomics).

Normal construction will be scheduled between 7 a.m. and 8 p.m., Monday through Friday. During construction and startup of the project, some activities may continue 24 hours per day, 7 days per week.

2.2.15 Facility Operation

The Applicant intends to operate the facility 24 hours per day, 7 days per week, for up to 12,000 hours per year total for the 3 combustion turbines. The air emissions associated with the operation of the SFERP are presented in Table 2-2.

TABLE 2-2
Air Emission Rates for the Combustion Turbines and Cooling Tower

Pollutant	Parts per Million by Volume @ 15% O_2	Pounds per Hour	Tons per Year
NOx	2.5[a]	4.41	39.8
SO2[b]	0.15	0.45	2.7
CO	4.0[a]	4.30	27.9
POC	2.0[a]	1.23	7.7
PM_{10}/ $PM_{2.5}$	n/a	3.0	18.2[c]

Notes:
[a] NOx, CO, and POC emission rates exclude startups and shutdowns (see Table 8.1-18).
[b] Based on annual average natural gas sulfur content of 0.33 gr/100 scf.
[c] Includes 0.2 tons per year of PM_{10}/ $PM_{2.5}$ emissions from the cooling tower.

2.3 Facility Safety Design

The facility will be designed to maximize safe operation. Hazards that could affect the facility include earthquake, flood, and fire.

2.3.1 Natural Hazards

The principal natural hazards associated with the site are earthquakes and floods. The site is located in Seismic Risk Zone 4. Structures will be designed to meet the seismic requirements of the California Code of Regulations (CCR) Title 24 and the 2001 California Building Code (CBC). Subsection 8.15, Geologic Hazards and Resources, discusses the geological hazards of the area and site. This section includes a review of potential geologic hazards, seismic ground motions, and the potential for soil liquefaction due to ground shaking. Appendix 10 includes the structural seismic design criteria for the buildings and equipment.

The site is essentially flat, with an average elevation of approximately 13.5 feet above mean sea level (msl) and roughly 500 feet (average) from the shoreline. The highest tide ever recorded in the project area is approximately 9.25 feet above the mean average sea level, measured using the North American Vertical Datum (NAVD) (AGS, 1999). Therefore, the project will have no potential to affect or be affected by flooding. Subsection 8.14, Water Resources, includes additional information on the potential for flooding.

2.3.2 Emergency Systems and Safety Precautions

This section discusses the fire protection systems and safety precautions to be used by project personnel. Subsection 8.7, Worker Health and Safety, includes additional information on safety for workers. Appendix 10 contains the design practices and codes applicable to safety design for the project. Compliance with these requirements will minimize project effects on public and employee safety.

2.3.2.1 Fire Protection Systems

The project will rely on both onsite fire protection systems and local fire protection services.

2.3.2.1.1 Onsite Fire Protection Systems. The fire protection systems will be designed to protect personnel and limit property loss and plant downtime from fire or explosion. The project will have the following fire protection systems.

CO_2 Fire Protection System. This system will protect the turbine, generator, and accessory equipment compartments from fire. The system will have fire detection sensors in all compartments. Actuating one sensor will provide a high temperature alarm on the combustion turbine control panel. Actuating a second sensor will trip the combustion turbine, turn off ventilation, close ventilation openings, and automatically release the CO_2. The CO_2 will be discharged at a design concentration adequate to extinguish the fire.

Local Fire Protection Services. In the event of a major fire, plant personnel will be able to call upon the San Francisco Fire Department for assistance. The Hazardous Materials Risk Management Plan (see Subsection 8.12, Hazardous Materials Handling) for the plant will include all information necessary to permit firefighting and other emergency response agencies to plan and implement safe responses to fires, spills, and other emergencies.

2.3.2.2 Personnel Safety Program

The project will operate in compliance with federal and state occupational safety and health program requirements. Compliance with these programs will minimize project effects on employee safety. These programs are described in Subsection 8.7, Worker Health and Safety.

2.4 Facility Reliability

This section discusses the expected plant availability, equipment redundancy, fuel availability, water availability, and project quality control measures.

2.4.1 Plant Availability

The Applicant intends that this facility is able to operate 24 hours per day, 7 days per week, for up to 12,000 engine hours per year cumulative total for the three combustion turbines.

2.4.2 Redundancy of Critical Components

The following subsections identify equipment redundancy as it applies to project availability. Specifically, redundancy in the power block is described. The power block will be served by the following balance-of-plant systems: DCIS, demineralized water system, and closed cycle cooling water system. Redundancy following final design may differ.

2.4.2.1 Power Block

Three separate combustion turbine power generation trains, consisting of a General Electric LM6000 PC Sprint gas turbine and its appurtenances, will operate in parallel within the power block. Each combustion turbine will provide approximately 33 percent of the total power block output. In addition to the combustion turbine-generators, the power block comprises the components described below.

2.4.2.1.1 CTG Subsystems. The combustion turbine subsystems will include the combustion turbine, inlet air filtration and inlet chilling system, generator and excitation systems, and turbine control and instrumentation. The combustion turbine will produce thermal energy through the combustion of natural gas; the thermal energy will be converted into mechanical energy through rotation of the combustion turbine, which drives the compressor and generator. The CTG generators will be totally enclosed and air-cooled. The generator excitation system will be a solid-state static system. Combustion turbine control and instrumentation (interfaced with the DCIS) will cover the turbine governing system, the protective system, and sequence logic.

2.4.2.2 DCIS

The DCIS will provide the following control, monitoring, and alarm functions for plant systems and equipment:

- Control the CTG and other systems in response to unit load demands (coordinated control)
- Provide control room operator interface
- Monitor plant equipment and process parameters and provide this information to the plant operators in a meaningful format
- Provide visual and audible alarms for abnormal events based on field signals or software generated signals from plant systems, processes, or equipment

2.4.2.3 Demineralized Water System

Water for the demineralized water system will be provided from the onsite recycled water system. The demineralized water system will consist of a RO system followed by an EDI system. Demineralized water will be stored in a suitable water tank.

2.4.2.4 Closed Cooling Water System

The closed cooling water system transfers heat from various plant equipment heat exchangers to the circulating water system through the cooling water heat exchangers. This subsystem includes motor-driven centrifugal pumps and a cooling water heat exchanger.

2.4.3 Fuel Availability

Fuel will be delivered by PG&E from its existing gas transmission line, located at the intersection of Illinois and 25th streets. Capacity at the natural gas transmission pipelines that supply natural gas to San Francisco is sufficient to supply the project. Because the project is not designed for a backup fuel supply, it would be shut down in the event natural gas service were interrupted.

2.4.4 Water Availability

The only source of process water for the project will be untreated wastewater from the combined sewer system. The availability of water to meet the needs of the project is discussed in more detail in Section 7, Water Supply, and Subsection 8.14, Water Resources.

2.4.5 Project Quality Control

The objective of the Quality Control Program will be to ensure that all systems and components have the appropriate quality measures applied during design, procurement, fabrication, construction, and operation. The goal of the Quality Control Program is to achieve the desired levels of safety, reliability, availability, operability, constructibility, and maintainability for the generation of electricity.

Assurance of the quality required for a system is obtained by applying appropriate controls to various activities. For example, the appropriate controls for design work are checking and review, and the appropriate controls for manufacturing and construction are inspection and testing. Appropriate controls will be applied to each of the various project activities.

2.4.5.1 Project Stages

For quality assurance planning purposes, project activities have been divided into the following nine stages:

- **Conceptual Design**—Activities such as the definition of requirements and basic engineering analyses.
- **Detail Design**—Activities such as the preparation of calculations, drawings, and lists needed to describe, illustrate, or define systems, structures, or components.
- **Procurement Specification Preparation**—Activities necessary to compile and document the contractual, technical, and quality provisions for procurement specifications for plant systems, components, or services.

- **Manufacturer Control and Surveillance**—Activities necessary to ensure that the manufacturers conform to the provisions of the procurement specifications.
- **Manufacturer Data Review**—Activities required to review manufacturers' drawings, data, instructions, procedures, plans, and other documents to ensure coordination of plant systems and components and conformance to procurement specifications.
- **Receipt Inspection**—Inspection and review of products upon delivery to the construction site.
- **Construction/Installation**—Inspection and review of storage, installation, and cleaning and initial testing of systems or components at the plant site.
- **System/Component Testing**—Actual controlled operation of electrical generating components in a system to ensure that the performance of systems and components conforms to specified requirements.
- **Plant Operation**—Actual operation of the energy facility system as the project progresses, the design, procurement, fabrication, erection, and checkout of each plant system will progress through the nine stages defined above.

2.4.5.2 Quality Control Records

The following quality control records will be maintained for review and reference:

- Project instructions manual
- Design calculations
- Project design manual
- Quality assurance audit reports
- Conformance to construction records drawings
- Procurement specifications (contract issue and change orders)
- Purchase orders and change orders
- Project correspondence

For procured component purchase orders, a list of qualified suppliers and subcontractors will be developed. Before contracts are awarded, the subcontractors' capabilities will be evaluated. The evaluation will include consideration of suppliers' and subcontractors' personnel, production capability, past performance, and quality assurance program.

During construction, field activities will be accomplished during the last four stages of the project: receipt inspection, construction/installation, system/component testing, and plant operation. The construction contractor will be contractually responsible for performing the work in accordance with the quality requirements specified by contract.

The contractors quality compliance along with that of any subcontractors will be surveyed through inspections, audits, and the administration of independent testing contracts.

An Operation and Maintenance (O&M) program, typical for a project of this size, will be implemented by the City or its maintenance contractor to control the quality of plant O&M. A specific program for this project will be defined and implemented during initial plant startup.

2.5 Laws, Ordinances, Regulations, and Standards

The applicable LORS for each engineering discipline are discussed in Section 10, Engineering, and included as part of the Engineering Appendices (Appendix 10).

2.6 Facility Closure

2.6.1 Introduction

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the combustion turbines. Causes for temporary closure include a disruption in the supply of natural gas or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to plant age, damage to the plant beyond repair, economic conditions, City policy, or other reasons. Subsection 2.6.2 discusses temporary facility closure; Subsection 2.6.3 discusses permanent facility closure.

2.6.2 Temporary Closure

For a temporary facility closure, where there is no release of hazardous materials, security of the facilities will be maintained on a 24-hour basis, and the California Energy Commission (CEC) and other responsible agencies will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan will be conducted to ensure conformance with all applicable laws, ordinances, regulations, and standards (LORS) and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Subsection 8.13, Waste Management.

Where the temporary closure includes damage to the facility, and there is a release or threatened release of acutely hazardous materials into the environment, procedures will be followed as set forth in a Risk Management Plan (RMP) to be developed as described in Subsection 8.12, Hazardous Materials. Procedures will include methods to control releases, notification of applicable authorities and the public, emergency response, and training for plant personnel in responding to and controlling releases of hazardous materials. Once the immediate problem is solved, and the acutely hazardous materials release is contained and cleaned up, temporary closure will proceed as described above for a closure where there is no release of hazardous materials.

2.6.3 Permanent Closure

The planned life of the generation facility is 30 years. However, if the generation facility is still economically viable and continued operation is still consistent with City policy, it could be operated longer. It is also possible that the facility could become economically noncompetitive earlier than 30 years, or that continued operation of the facility could become inconsistent with City policy within the initial 30 years of operation, forcing early

decommissioning. Whenever the facility is permanently closed, the closure procedure will follow a plan that will be developed as described below.

The removal of the facility from service, or decommissioning, may range from "mothballing" to the removal of all equipment and appurtenant facilities, depending on conditions at the time. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the CEC and the City when more information is available and the timing for decommissioning is imminent.

To ensure that public health and safety and the environment are protected during decommissioning, a decommissioning plan will be submitted to the CEC for approval prior to decommissioning. The plan will discuss the following:

- Proposed decommissioning activities for the facility and all appurtenant facilities constructed as part of the facility
- Conformance of the proposed decommissioning activities to all applicable LORS and local/regional plans
- Activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities
- Decommissioning alternatives other than complete restoration
- Associated costs of the proposed decommissioning and the source of funds to pay for the decommissioning

In general, the decommissioning plan for the facility will attempt to maximize the recycling of all facility components. Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to ensure public health and safety and to protect the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to all applicable LORS. The site will be secured 24 hours per day during the decommissioning activities.

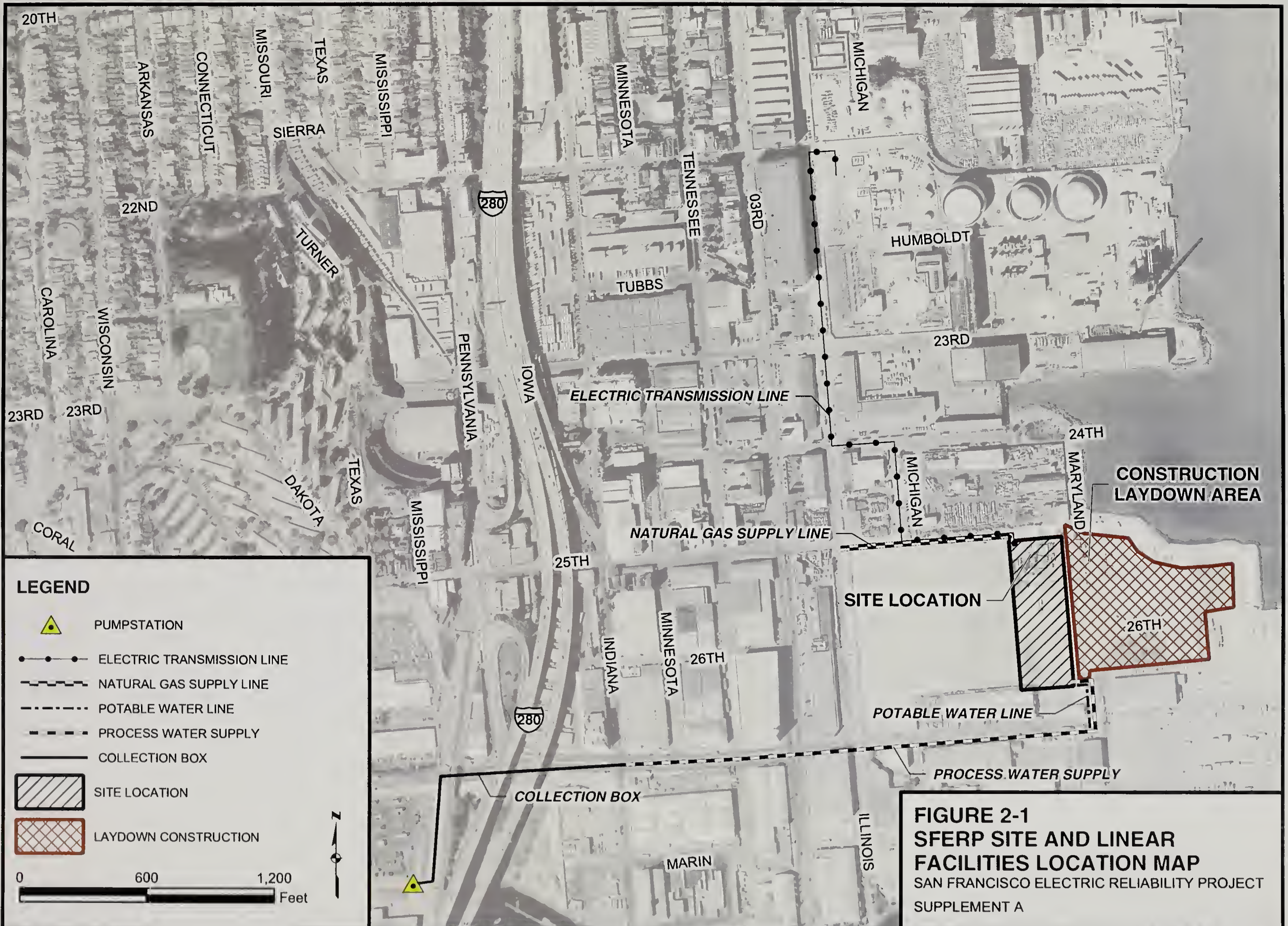

FIGURE 2-1
SFERP SITE AND LINEAR FACILITIES LOCATION MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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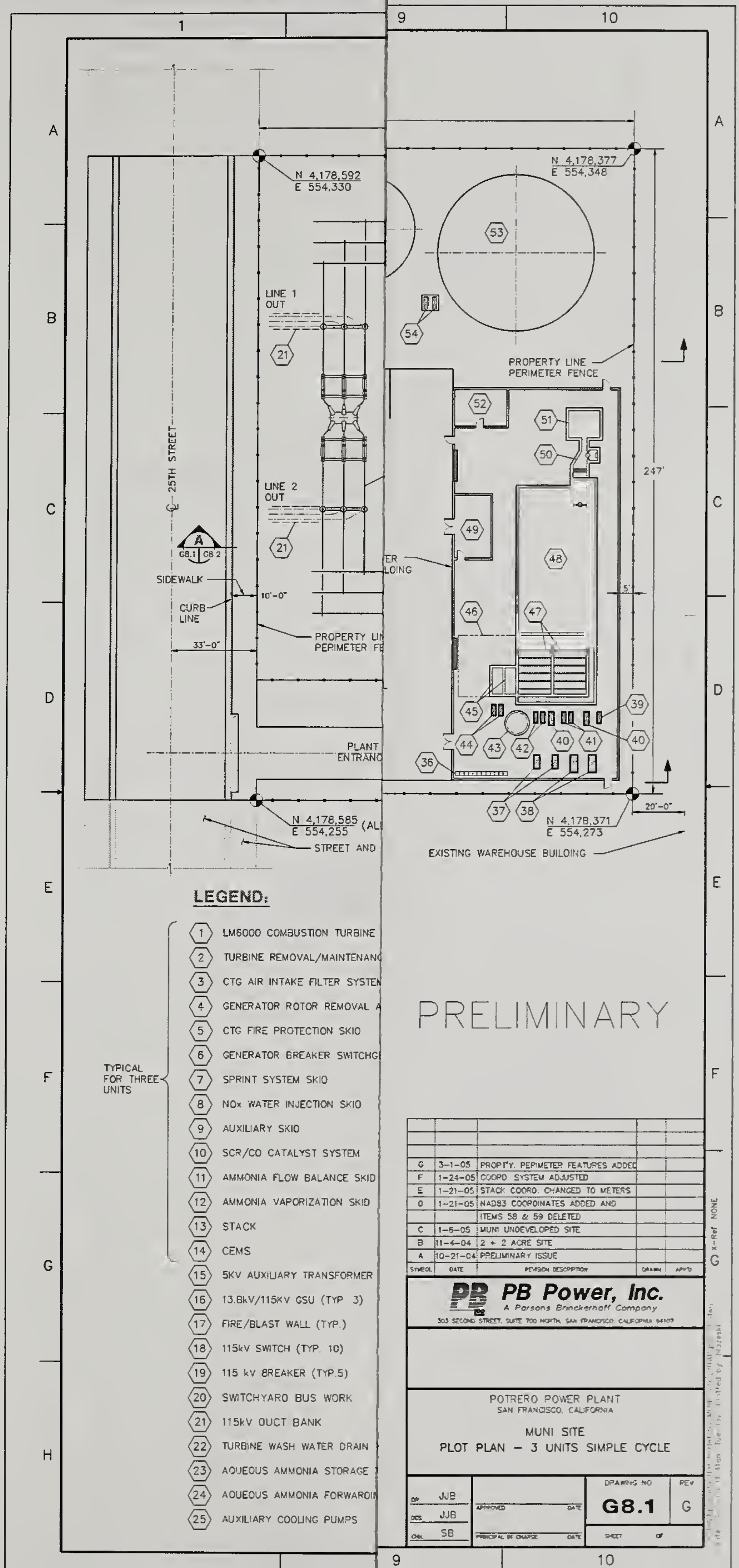

FIGURE 2-2
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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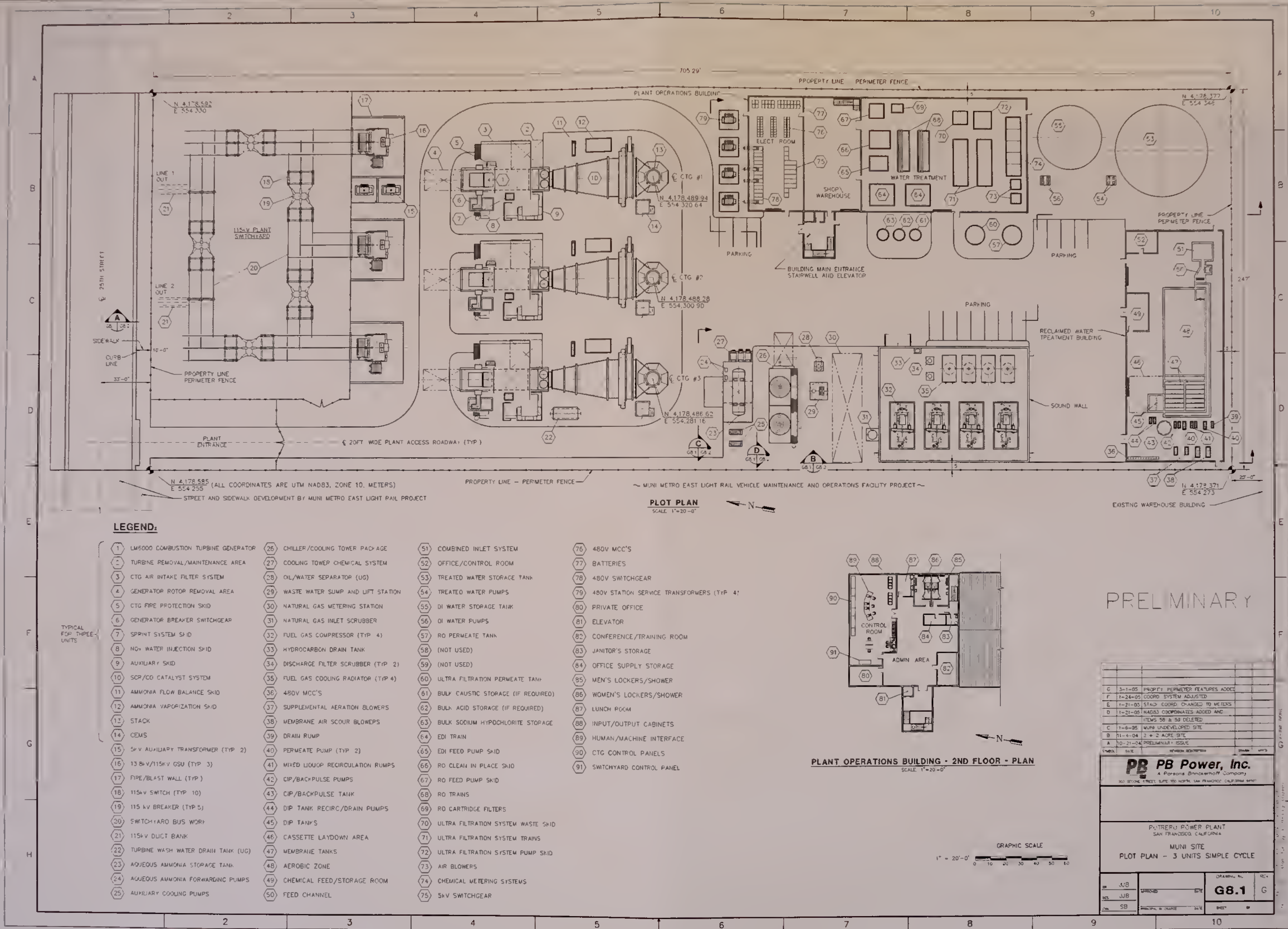

FIGURE 2-2
SITE LAYOUT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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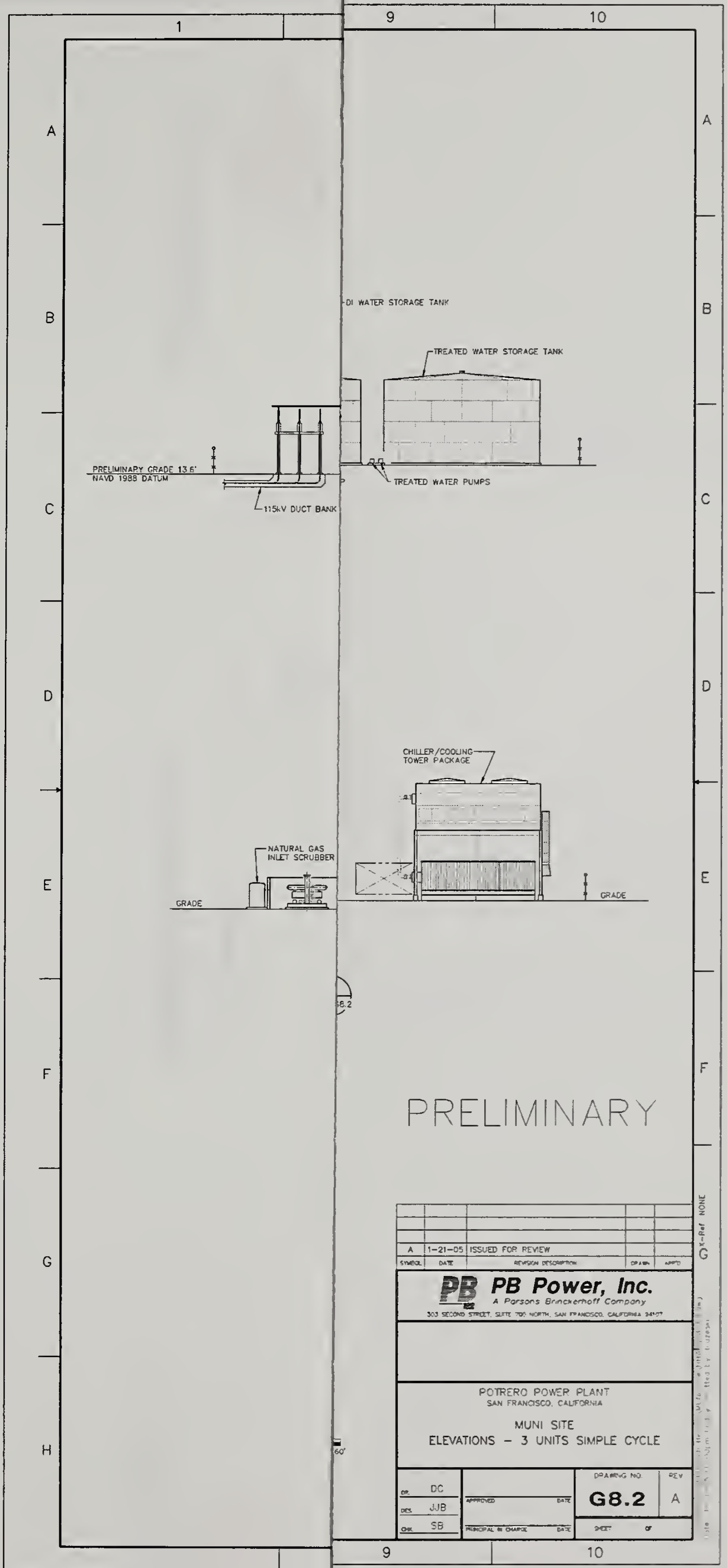

FIGURE 2-3
PLANT ELEVATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

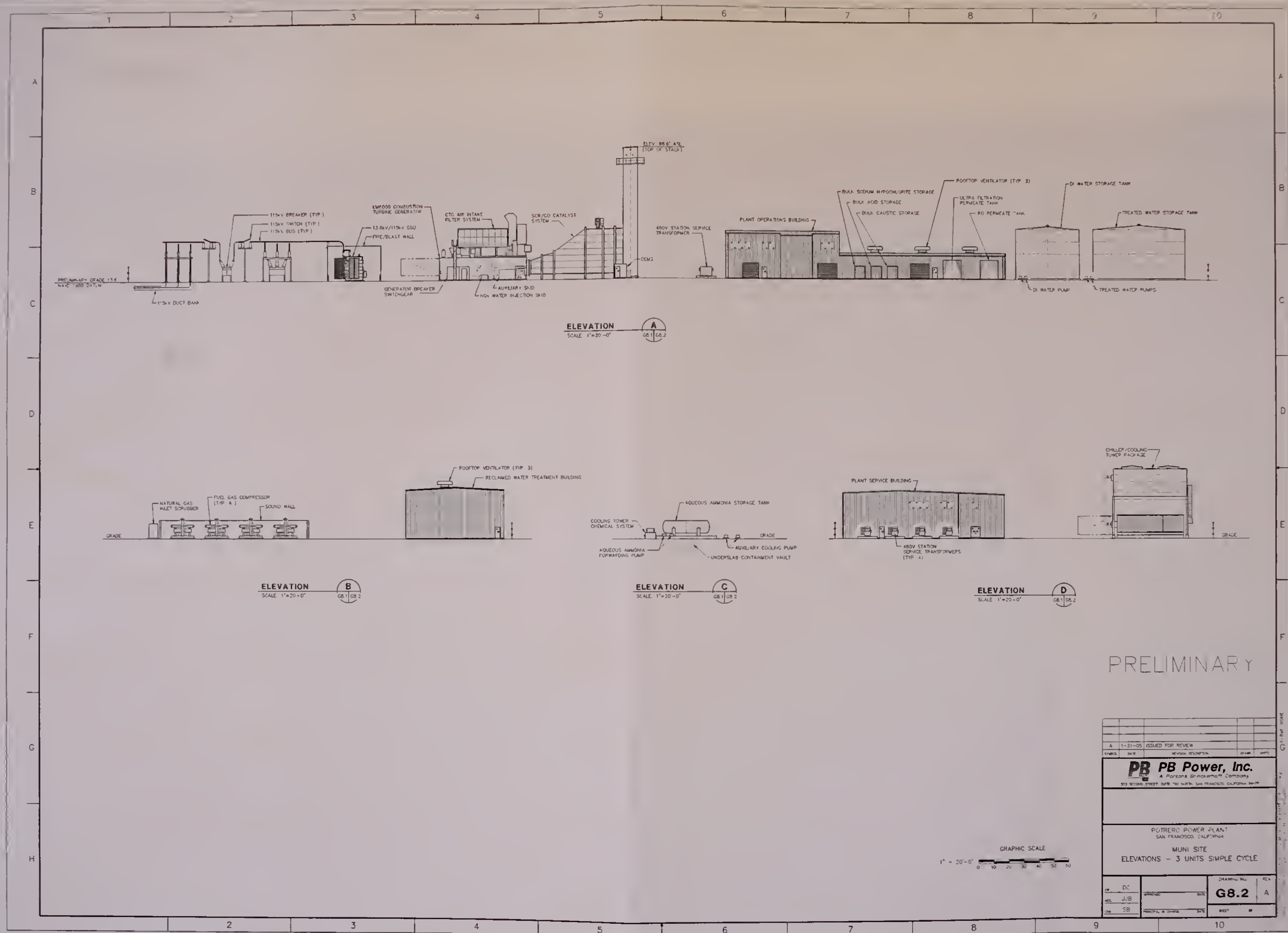

FIGURE 2-3
PLANT ELEVATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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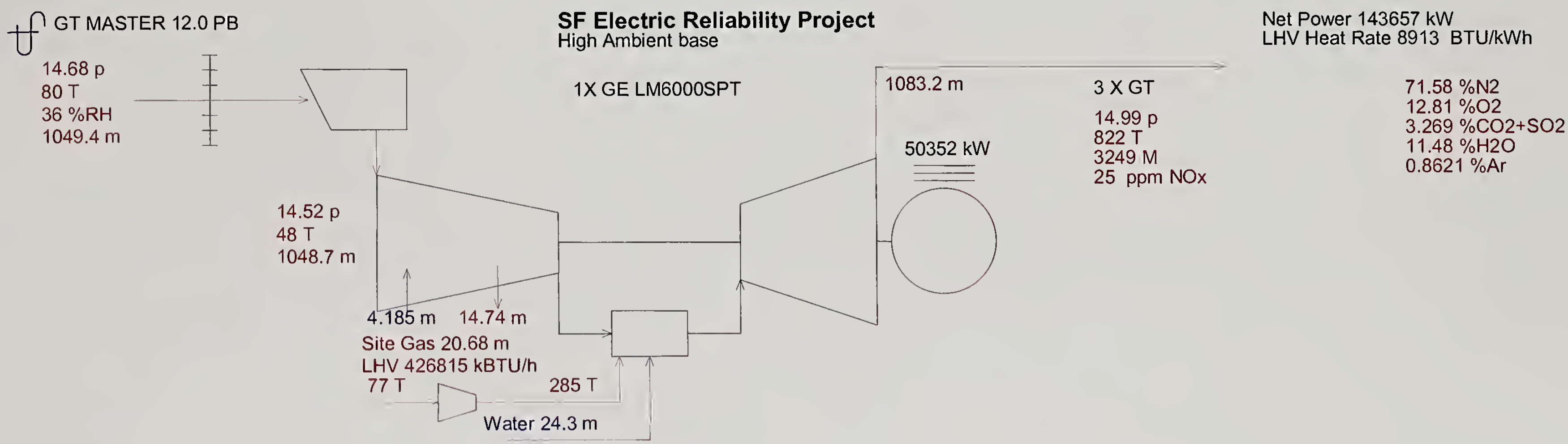
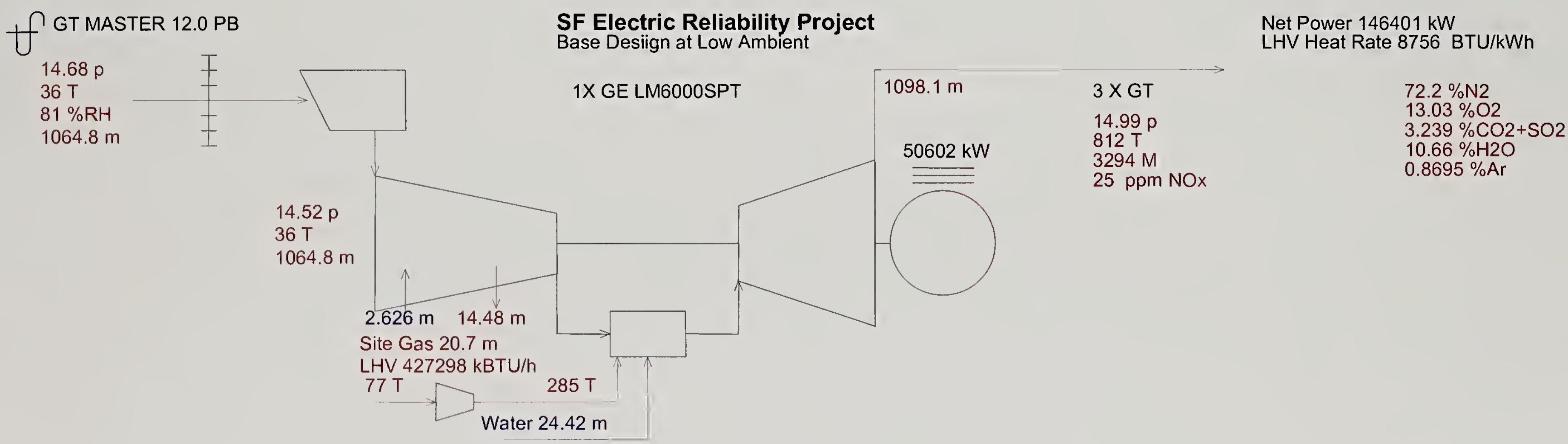


FIGURE 2-4a
HEAT BALANCE
HIGH AMBIENT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL



p[psia], T[F], M[kpph], Steam Properties: Thermoflow - STQUIK

FIGURE 2-4b
HEAT BALANCE
LOW AMBIENT
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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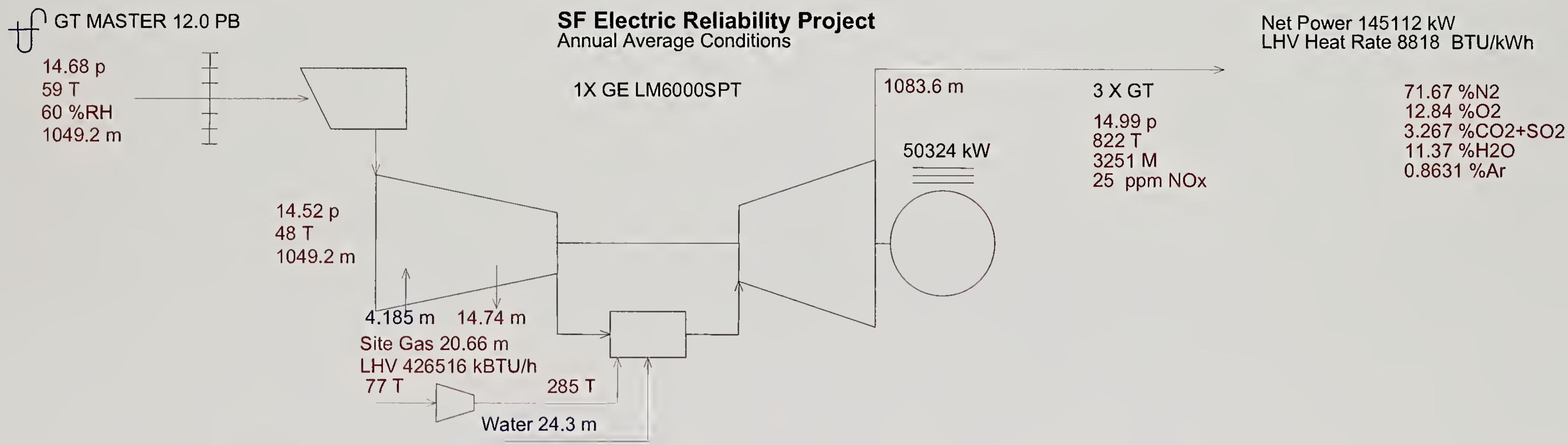

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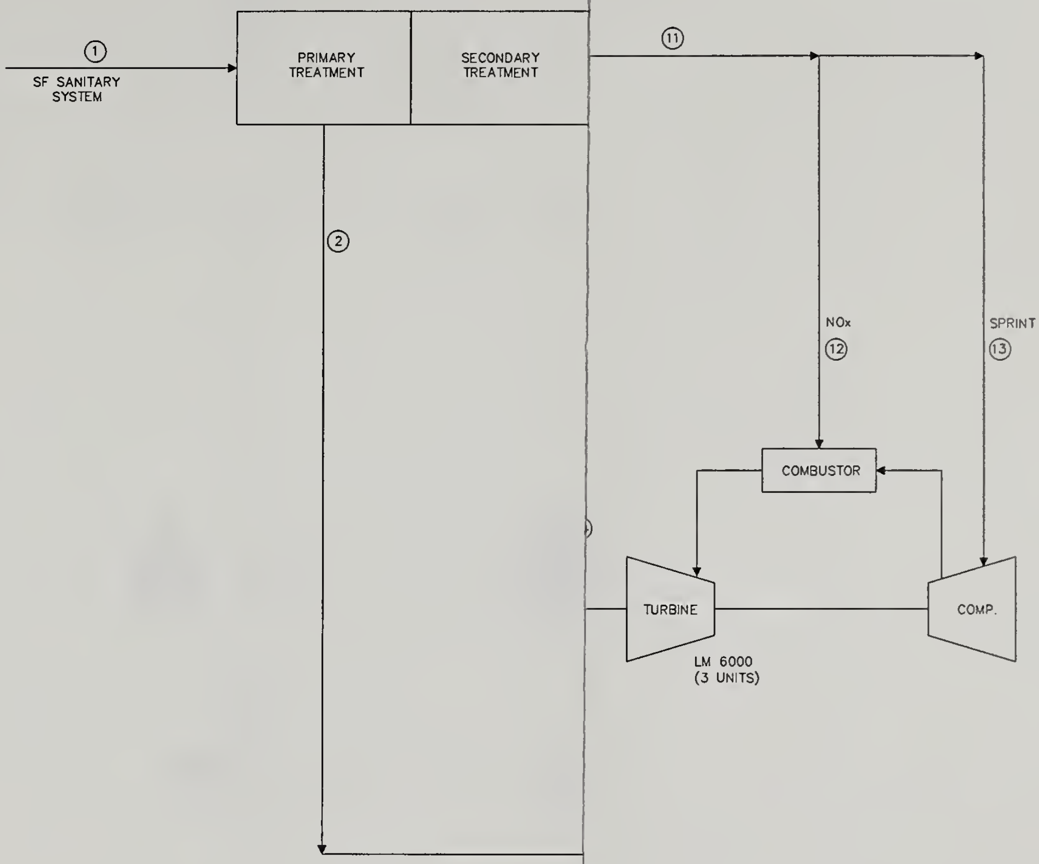
FIGURE 2-4c
HEAT BALANCE
ANNUAL AVERAGE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL



SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		

PB Power, Inc.
A Parsons Brinckerhoff Company
303 SECOND STREET, SUITE 700 NORTH, SAN FRANCISCO, CALIFORNIA 94107

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR. LTW
DES. CM
CHK. CM

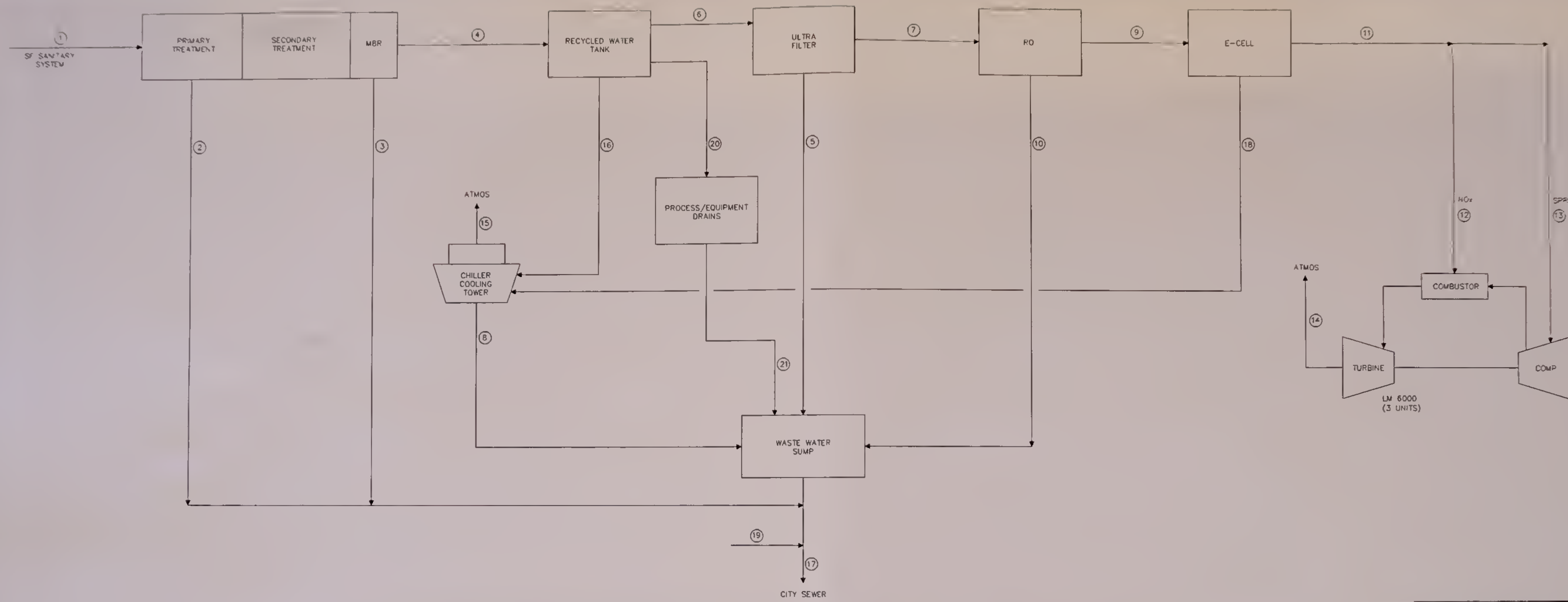
APPROVED DATE
PRINCIPAL IN CHARGE DATE

DRAWING NO M2.2 REV E
SHEET OF

T022005001RDD_11 (2/16/05)

FIGURE 2-5
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL



SFPUC Electric Reliability Project - Water Balance

Rev E

Point No	From	To	Average Water Use (3 CTG's in Operation) GPM	Maximum Water Use (3 CTG's in Operation) GPM	Notes
1	SF sanitary system	Primary/Secondary Treatment	349	408	
2	Primary Treatment	Plant wastewater system	100	100	
3	MBR	Plant wastewater system	10	12	
4	MBR	Recycled water tank	239	296	
5	Ultra Filter Reject	Plant Waste Water Sump	15	14	
6	Reclaimed water tank	Ultra Filter Inlet	222	221	
7	Ultra Filter Product	RO Inlet	207	206	
8	Cooling Tower Blowdown	Plant Waste Water Sump	5	16	(@ 5 cycles of conc)
9	RO Product	E-Cell Inlet	175	174	
10	RO Reject	Plant Waste Water Sump	33	32	
11	E-Cell Product (DI Water)	CTG NOx & SPRINT Injection	166	165	
12	E-Cell Product (DI Water)	CTG NOx Injection	141	140	@ 25 ppm NOx
13	E-Cell Product (DI Water)	CTG SPRINT Injection	25	25	
14	DI Water Evaporation	Atmosphere	166	165	
15	Cooling Tower Evaporation	Atmosphere	19	84	
16	Recycled Water Tank	Cooling Tower Makeup	15	71	
17	Plant wastewater system	City Sanitary Sewer	166	183	
18	E-Cell Reject	Cooling Tower Makeup	9	9	
19	Domestic	Plant wastewater system	2	4	
20	Recycled water tank	Plant / equipment drains	2	4	
21	Plant / equipment drains	Plant Waste Water Sump	2	4	

Annual reclaimed water usage: 43,013,015 gallons
(based on 12,000 turbine-hours) 132 acre-feet

Symbol	Date	Revision Description	Drawn	Appd
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		

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SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR. LTW
DES. CM
CHK. CM
APPROVED DATE
PRINCIPAL IN CHARGE DATE
DRAWING NO. M2.2 REV E
SHEET OF

FIGURE 2-5
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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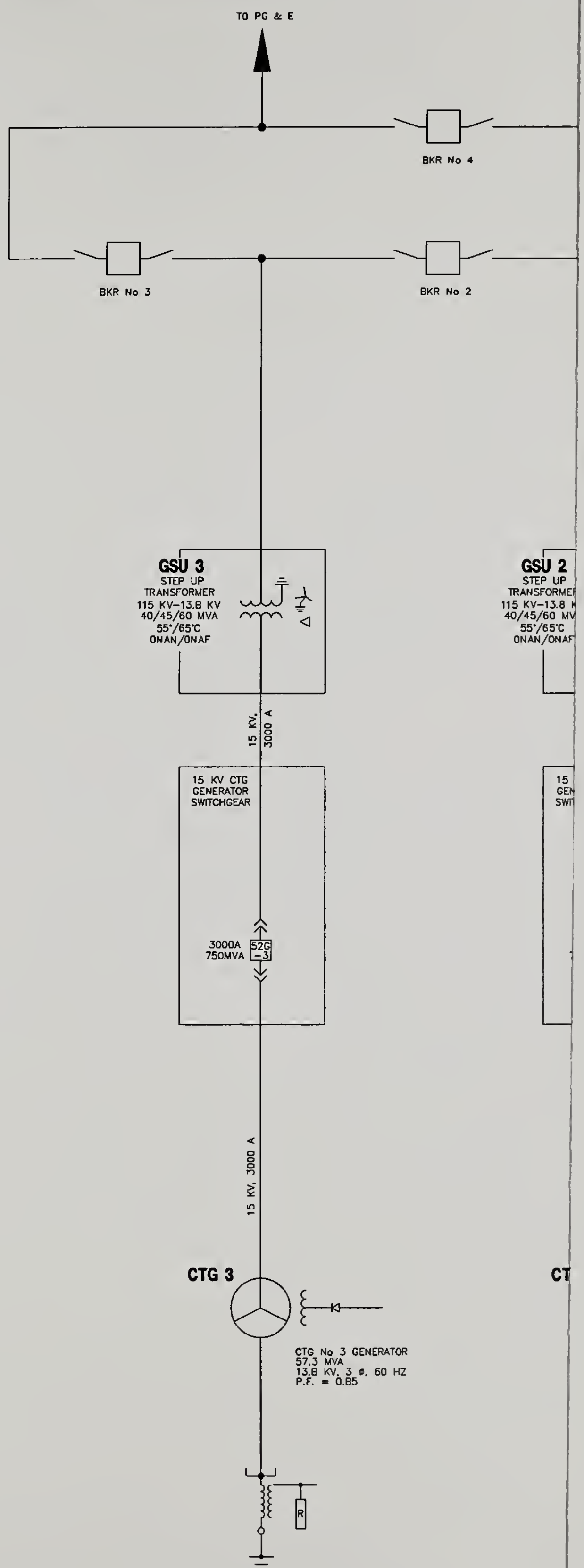

SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
C	02-19-04	REVISED EQUIP. NUMBERS & RATINGS		
		AND ADDED 2-480V TRANSFORMERS		
B	02-06-04	REMOVED CTG 4		
A	12-29-03	PRELIMINARY ISSUE FOR REVIEW		

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ELECTRIC RELIABILITY PROJECT
COMPOSITE SINGLE–LINE

			DRAWING NO	REV
DR.	JP	APPROVED DATE	E2.1	C
DES.	JP			
CHK.	JE	PRINCIPAL IN CHARGE DATE	SHEET OF	

FIGURE 2-6
COMPOSITE SINGLE–LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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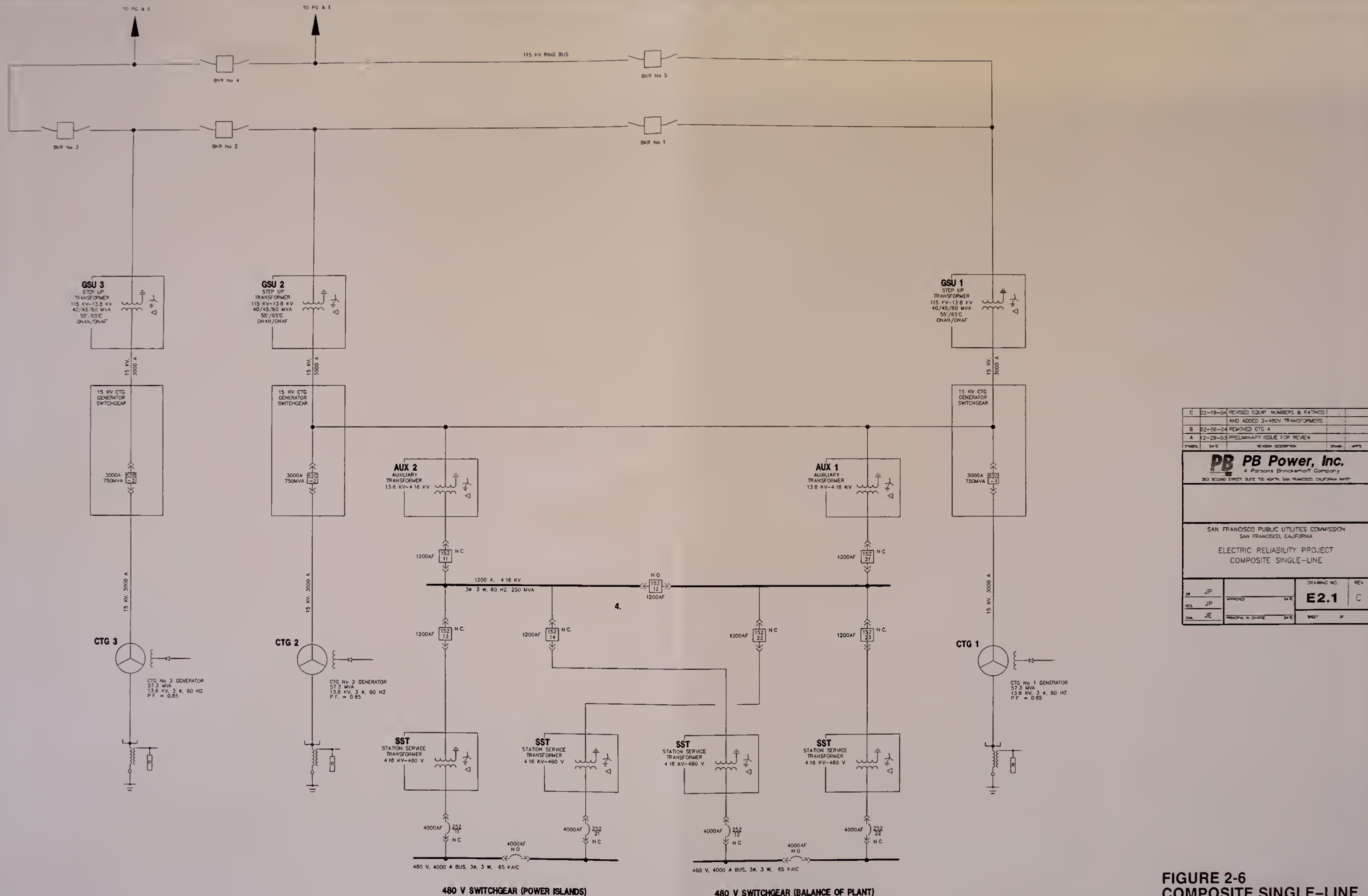

FIGURE 2-6
COMPOSITE SINGLE-LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

T022005001RDD 12 (2/18/05)

SECTION 3.0

Purpose and Need

SECTION 3.0

Purpose and Need

3.1 Introduction

The San Francisco Electric Reliability Project (SFERP) is needed, as part of a portfolio, to maintain systems reliability and provide for the closure of existing power plants. The SFERP will consist of three combustion turbines with a total combined output of 145 megawatts (MW).

3.2 Policy Overview

For over four years, closure of the Hunters Point Power Plant has been a City objective. More recently, the City's interest in closing down the Hunters Point Power Plant has been extended to limiting use of and eventually closing down the Potrero Power Plant.

On July 9, 1998, the City entered into an agreement with Pacific Gas and Electric Company (PG&E) that provided for the shutdown of the Hunters Point Power Plant "as soon as the facility is no longer needed to sustain electric reliability in San Francisco and the surrounding area and the FERC authorizes PG&E to terminate the Reliability Must Run agreement for the facility" (CCSF, 1998).

On May 21, 2001, the Board of Supervisors passed Ordinance 124-01, which set forth conditions for the siting of new generation at the Potrero Power Plant in Southeast San Francisco. This ordinance requires closure of Hunters Point Power Plant; cleanup and limitations on use of Potrero units 4, 5, and 6; and cleanup and eventual closure of Potrero Unit 3.

On November 21, 2002, the Board of Supervisors passed Resolution No. 827-02. In this resolution, the Board of Supervisors adopted the Electricity Resource Plan developed by the City's Public Utilities Commission and the Department of Environment (SF Electricity Resource Plan) "as a policy guideline to be used in proposing and implementing specific actions, subject to the requirements necessary to comply with environmental laws, including an analysis of alternatives and mitigations."

The SF Electricity Resource Plan establishes the following priorities (SFPUC and San Francisco Department of Environment, 2002):

- Maximize Energy Efficiency
- Develop Renewable Power
- Assure Reliable Power
- Support Affordable Electric Bills
- Improve Air Quality and Prevent Other Environmental Impacts
- Support Environmental Justice
- Promote Opportunities for Economic Development
- Increase Local Control Over Energy Resources

To achieve these goals and allow for closure of existing within-City generation, the SF Electricity Resource Plan provides for development of a portfolio of new energy resources that includes energy efficiency improvements, renewable resources, distributed generation using renewable and clean technologies, transmission additions, and new highly-efficient and operationally flexible generation at appropriate sites. The SFERP is part of the generation component of the SF Electricity Resource Plan. The City remains committed to maximizing energy efficiency, developing renewable power, encouraging clean distributed generation and supporting needed transmission additions. Nonetheless, the siting of new generation is also necessary in order to enable the prompt closure of the Potrero Power Plant, and to meet reliability requirements.

In addition, by providing for improvements in reliability and facilitating improvements in air quality, the SF Electricity Resources Plan and the SFERP supports the general policy determinations of both the California Energy Commission's (CEC's) Integrated Energy Policy Report and the Energy Action Plan endorsed by the CEC, the California Public Utilities Commission, and California Power Authority.

3.3 Technical Background

The City and County of San Francisco (CCSF) is served by a combination of power imported over the high voltage transmission system and by power produced by generating units located within the City. There is insufficient transmission capacity or capability to reliably meet all of the City and peninsula's electrical loads. Therefore, both transmission and generation resources are necessary to reliably serve San Francisco and the peninsula.

3.3.1 Generation

In-City generation consists of two natural gas fired boiler-steam turbine-generator power plants, see Table 3-1. The 46-year-old, 163 megawatt (MW) Hunters Point Power Plant Unit 4 is owned by PG&E and the 39-year-old, 206 MW Potrero Power Plant Unit 3 is owned by Mirant. In addition, the Hunters Point Power Plant includes one 28-year-old, 52-MW, diesel-fuel-fired peaking turbine (Hunters Point 1). The Potrero Power Plant also includes three 28-year-old, 52-MW, diesel-fuel-fired, peaking turbines (Potrero 4, 5, 6). In combination, these plants provide 570 MW of local generation (SFPUC and San Francisco Department of Environment, 2002). In addition to the Hunters Point and Potrero power plants presented in Table 3-1, there is a 25 MW, combined-cycle combustion turbine generating unit on the northern peninsula, United Cogen.

Due to environmental restrictions, the operation of each of the diesel fuel-fired, peaking turbines in San Francisco is limited to no more than 877 hours per year. The steam generating units, Potrero Unit 3 and Hunters Point Unit 4, have been required to meet increasingly stringent NO_x restrictions under Bay Area Air Quality Management District (BAAQMD) regulations. Specifically, each generation owner's Bay Area fleet of fossil-fueled power plants has been required to meet the following average NO_x emission levels:

Jan. 1, 2002 - 47 parts per million (ppm)
Jan. 1, 2004 - 31 ppm
Jan. 1, 2005 - 15 ppm

For Potrero Unit 3 to continue to operate in compliance with BAAQMD NO_x limits in 2005 and beyond, Mirant had to either install selective catalytic reduction (SCR) equipment or run the unit at reduced load in conjunction with operation of lower NO_x emitting plants. Potrero Unit 3 is currently undergoing the SCR retrofit and is expected to be back online in June 2005. To continue operation of Hunters Point Unit 4 and remain in compliance with maximum BAAQMD NO_x emissions levels, PG&E intends to use interchangeable emission reduction credits (IERCs) and thus temporarily avoid the installation of SCR equipment. In the context of an appeal to the BAAQMD Hearing Board regarding the issuance of IERCs, PG&E has reached a settlement with community groups for use of IERCs through 2005. IERCs may be available for limited operation of Hunters Point Unit 4 for short periods beyond 2005. However, if Hunters Point Unit 4 is to continue to operate over a longer term, it will require substantial NO_x emission control equipment retrofits.

Table 3-1 below describes the existing power generation in San Francisco.

TABLE 3-1
In-City Generation, Output, and Fuel Type

Plant	Unit	Size (MW)	Fuel Type	In Service Date
Potrero	3	207	Natural Gas	1965
	4	52	Diesel	1976
	5	52	Diesel	1976
	6	52	Diesel	1976
Hunters Point	4	163	Natural Gas	1958
	1	52	Diesel	1976

3.3.2 Transmission System

The transmission system that supplies electricity to the peninsula and San Francisco is insufficient and incapable of serving the load in these areas without some in-area generation. There are four major constraints to the physical importation of electric power to San Francisco from other areas of the State. The first constraint is a restriction of the import capability into the Greater Bay Area (GBA). The second constraint is a restriction on the amount of power that can be transmitted to the peninsula from the East Bay. The third constraint is a restriction in the amount of power that can be supplied to the northern peninsula, including the City. And the fourth constraint involves capacity limitations on the 115-kV underground cable transmission system north of Martin Substation into the City (R.W. Beck et al., 2002).

The GBA transmission system consists primarily of four major outlying 500/230-kV substations (PG&E's Vaca-Dixon, Tesla and Metcalf substations and Western's Tracy substation) and a network of 230-kV "import" circuits across the boundary. The capability of the 500/230-kV transformer banks and 230-kV lines determine how much power can be imported into the GBA. The limited capacity of these facilities requires support from generation located within the GBA to meet GBA load requirements. Consequentially, the CAISO is forced to enter into RMR agreements to secure a large amount of generating capacity within the GBA. These RMR agreements allow the CAISO to dispatch generators or obtain load reductions when necessary to maintain local area reliability. In September 2004,

the CAISO calculated that for 2005, 3,493 MW of RMR capacity was needed in the GBA, even considering the requirements met by municipal and Qualifying Facility generation that can already be relied upon to be online when needed (Kott, 2004).

A further constraint to serving San Francisco's electrical load arises from the limited transmission capacity from the East Bay into the San Mateo substation. There are only two sets of 230-kV transmission lines (and two sets of smaller 115-kV transmission lines) that interconnect the San Mateo substation with the East Bay. One 230 kV line crosses the Bay parallel to the San Mateo Bridge. The other 230-kV line crosses the Bay parallel to the Dumbarton Bridge. Due to capacity limitations on these lines, some peninsula-based generation must be operated during peak load and contingency conditions to prevent overloading these lines.

An additional limiting condition currently exists north of the San Mateo substation. To prevent overloading the transmission lines serving the upper peninsula and San Francisco at certain load levels and maintenance conditions, a minimum level of generation must be operating at Hunters Point Power Plant and/or Potrero.

Finally, a capacity limitation exists on the 115-kV underground cable transmission system from the Martin Substation into the City. This constraint limits the efficacy of transmission projects, such as the Jefferson-Martin line, in increasing the load-serving capability of the City.

The peak electrical load for San Francisco and the peninsula exceeds the load serving capability of the electric transmission system. For 2005, the CAISO designated all the units at Hunters Point Power Plant and the Potrero Power Plant as RMR units (Kott, 2004)[1]. Operation of these units can relieve constraints on all the electrical paths to and within the GBA, the peninsula, and north of San Mateo as described above.

Given the significant transmission constraints in the area, since its inception, the CAISO has dedicated particular attention to studying the system in San Francisco and the peninsula and has identified numerous recommended transmission system improvements. Since 1999, the CAISO has been evaluating the need for an additional 230-kV line from the Peninsula into the City to relieve the constraint north of San Mateo substation. In 2002, the CAISO Governing board approved the Jefferson-Martin transmission line to transport additional power up the peninsula from the GBA. In 2004, PG&E obtained a certificate of public convenience and necessity (CPCN) from the California Public Utilities Commission (CPUC) for the Jefferson-Martin line which is scheduled to be in service in the first or second quarter of 2006. In the context of the 2003 and 2004 transmission planning processes, additional transmission projects have been identified that could improve the effectiveness of the Jefferson-Martin line and otherwise increase load servicing capability in the peninsula and San Francisco.

In addition, the CAISO is in the process of evaluating four transmission alternatives to meet planning criteria subsequent to the construction of the Jefferson-Martin line through 2018. The four alternatives include:

1. Reconductoring alternative. This alternative involves upgrading existing transmission lines through reconductoring.

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[1] The CAISO released Hunters Point Power Plant units 2 and 3, which are synchronous condenser units, from the applicable RMR agreement for 2005.

2. New 230-kV Moraga to Potrero alternative. This alternative involves construction of a 230-kV transmission line from the Moraga substation in the East Bay to the Potrero substation in San Francisco.
3. New 230-kV Tesla to Potrero alternative. This alternative involves installing a new 230-kV circuit from Tesla substation to San Ramon substation, reconductoring the 230-kV circuits connecting San Ramon and East Shore substations, and installing a new 230-kV circuit from the East Shore to the Potrero substations.
4. New DC Pittsburg to Potrero alternative. This alternative involves installing a DC line from Pittsburg to Potrero, using a submarine cable for the portion of the line that is in the Bay.

The CAISO is also undertaking a study of the economic benefits of these alternatives.

Based on these evaluations, on April 28, 2005, the CAISO is expected to make a recommendation on the next phase for transmission expansion for San Francisco and the peninsula to the CAISO Governing Board.

The studies are not now envisioned, however, to consider RMR, reactive margin, or operational needs. Unless these requirements are addressed, there is no certainty that the transmission alternatives that are being evaluated will provide for release of the Potrero Power Plant from its RMR Agreement. The latest information on the need for generation within the city to meet operational needs is set forth in correspondence from PG&E to the CAISO in May 2004. This correspondence indicates that 200 MW of generation is needed north of San Mateo substation. Moreover, as described in the following section, the CAISO's Action Plan for San Francisco includes the SFERP and a small City generating facility to be located at the San Francisco International Airport among the elements necessary to terminate the RMR Agreement for units at the Potrero Power Plant.

Moreover, unlike transmission alternatives, the SFERP will add real power and reactive power into the electrical grid near the load. Thus, the SFERP will be available to provide voltage support, reduce system losses, and increase operational reliability and flexibility. These attributes are true whenever generation is sited close to load and the alternative sources of generation to serve that load must be transported over long and heavily-loaded transmission lines. This is especially true for new generation located within San Francisco as documented by CAISO and CEC Staff in their testimony that comprises the Final Local System Effects section of the FSA for the proposed Potrero 7 Power Plant. (00-AFC-4).

3.4 Benefits of SFERP and Consistency with City Energy Policy

3.4.1 Closure of In-City Generation

Construction of the SFERP, in combination with the construction of a number of planned transmission projects and the construction of a small generating facility at the San Francisco International Airport, will provide for the release of units at the Potrero Power Plant from the applicable RMR agreement. Release from the RMR agreement will eliminate an important source of revenue from continued operation of the units and will allow Mirant Potrero LLC to shut down the units. The City is committed to securing closure of the Potrero Power Plant through negotiations with Mirant or other means. Prior to the

construction of the SFERP, completion of the Jefferson-Martin transmission project, and a number of additional transmission projects that are currently either complete or in progress, will provide for closure of the Hunters Point Power Plant.

3.4.1.1 The Action Plan for San Francisco

Over the past two years, the City and other stakeholders have worked with the CAISO to extensively study the physical and operational requirements of the San Francisco and peninsula electric transmission systems. The studies assessed the requirements to maintain system reliability and, at the same time, shut down aging in-City generation. This effort culminated in presentation to the CAISO Board of an Action Plan for San Francisco on September 10, 2004. After stakeholder review and input, the CAISO revised the Action Plan for San Francisco and on November 5, 2004, the revised plan was adopted by the CAISO Board (the SF Action Plan). The SF Action Plan defines the new facilities that are necessary to release all existing in-City generation at the Hunters Point and Potrero Power Plants from the applicable RMR agreements. The requirements set forth in the SF Action Plan are summarized in the following subsections.

3.4.1.2 Release Hunters Point Power Plant from the Applicable RMR Agreement

The SF Action Plan describes the requirements to release all four units at the Hunters Point Power Plant from the applicable RMR agreement. Units 2 and 3 of the Hunters Point Power Plant, which have been operating as synchronous condensers to provide local VAR support, can be removed from service once PG&E completes the installation of a new static VAR compensator. The CAISO did not renew the RMR agreement for Units 2 and 3 in 2005.

The remaining two units, Units 1 and 4, can be released from the applicable RMR agreement when 9 system improvements, including the Jefferson Martin line, are completed. These projects are listed in Table 3-2. As indicated in Table 3-2, all items required for the release of Hunters Point Power Plant from the applicable RMR agreement are scheduled for completion by March 2006. Once the plant is released from the RMR agreement, PG&E is required to close it down consistent with the 1998 agreement between the City and PG&E.

TABLE 3-2
Requirements for the Release of Hunters Point Units 1 and 4 from the RMR Agreement

	Project	Estimated Completion Date
1	San Mateo-Martin No. 4 Line Voltage Conversion from 60 to 115 kV	Completed
2	Ravenswood 2nd 230/115 kV Transformer Project	Completed
3	San Francisco Internal Cable Higher Emergency Ratings to be used in conjunction with Jefferson-Martin Line	Completed
4	Reconductor Tesla-Newark No. 2 230-kV line	May 2005
5	Reinforcement of Ravenswood-Ames 115-kV lines	May 2005
6	San Mateo 230-kV Bus Insulator Replacement	May 2005
7	Install Potrero-Hunters Point (AP-1) 115-kV Cable	December 2005
8	Install Jefferson-Martin 230-kV Line	March 2006
9	Potrero Unit 3 SCR retrofit	June 2005

3.4.1.3 Release Potrero Power Plant Unit 3 from the Applicable RMR Agreement

With the projects described in Table 3-2 completed, the SF Action Plan specifies that Potrero Power Plant Unit 3 can be released from the applicable RMR agreement once the three combustion turbines that comprise the SFERP and a fourth combustion turbine that the City intends to locate at the San Francisco International Airport, are operational. The commercial operating date for these units is June 2007.

3.4.1.4 Release Potrero Power Plant Units 4, 5 and 6 from the Applicable RMR Agreement

The SF Action Plan further indicates that, once the conditions are in place for release of Potrero Power Plant Unit 3 from the applicable RMR agreement, including construction of the SFERP, the remaining generation located at the Potrero Units 4, 5 and 6, can be released from the applicable RMR agreement once the transmission projects listed in Table 3-3 are completed. The projects should be completed by 2007.

TABLE 3-3
Requirements for the Release of Potrero Units 4,5 and 6 from the RMR agreement

	Project	Estimated Completion Date
1	Upgrade the Newark-Dumbarton 115-kV line	May 2006
2	Upgrade the Blair-Belmont 115-kV line	May 2007
3	Upgrade the Metcalf-Hicks and Metcalf-Vascona 230-kV lines	May 2007
4	Add Voltage Support at the Ravenswood substation	May 2007

3.4.2 The SFERP Will Facilitate the Reduction of NO_x Emissions and Thereby Reduce Other Environmental Effects and Support Environmental Justice

Currently, the Potrero and Hunters Point Plants are the largest stationary sources of oxides of nitrogen (NO_x) in San Francisco.

Table 3-4 presents the NO_x and PM_{10} emissions per MWh for existing generating units in the City and the projected emissions per MWh of the SFERP. The table illustrates that the biggest emitters (per MWh) among the within-City generating units are the four peaking units in San Francisco, which have minimal emission controls for oxides of nitrogen and produce 25 times more of this pollutant per MWh than the SFERP. Table 3-4 also shows that the NO_x emissions per MWh from the SFERP are a little less than half of those of Potrero Unit 3, even after installation of SCR on that unit.

TABLE 3-4
Emissions Per Megawatt-Hour for Existing and Proposed Plants

Plant	NO_x (pounds per MW-hour)	PM_{10} (pounds per MW-hour)
Potrero 3	1.1	0.03
Hunters Point 4	0.7	0.03
Hunters Point and Potrero Peakers	2.4 to 2.9	0.4
Potrero 3 (retrofit)	0.2	0.03
SFERP	0.09	0.06*

* Rubenstein, 2004.

The PM_{10} emissions per MWh for SFERP set forth in Table 3-4 are higher than those for Potrero Unit 3 and Hunters Point Unit 4. However, this is a reflection of the fact that the emission rate for Potrero 3 and Hunters Point 4 is their average emission rate, while the value for SFERP is the proposed permit limit, which is the maximum allowable level at any time, under any operating condition. There is no permit limit on the amount of PM_{10} emitted by Potrero 3 and Hunters Point 4. It is likely that under actual operating conditions, SFERP will emit significantly less particulates per MWh than either Potrero 3 or Hunters Point 4.

Closure of the Hunters Point Power Plant in combination with retrofitting Potrero Power Plant Unit 3 with SCR technology would result in a substantial overall reduction of NO_x from in-City plants. Additional overall reductions would result to the extent the SFERP provides a basis for retiring the Potrero Power Plant Unit 3 and the Potrero Power Plant peakers (Potrero Units 4, 5, and 6).

The substantial reduction of air emissions resulting from the closure of the Hunters Point and Potrero power plants is particularly critical in responding to air quality concerns of the Hunters Point and Potrero communities. These communities share a common concern for public health, especially that of children and the elderly. Because all in-City generation has been located in Hunters Point and Potrero, these communities have borne a disproportionate impact from power generation in the City. The City also recognizes that, although the modeling shows that the SFERP is not expected to contribute significantly to cumulative regional or localized impacts of any pollutants, including NO_2 and PM_{10} there will be PM_{10} impacts from the SFERP in both Potrero and Bayview/Hunters Point. Although the impacts of toxic air contaminants from the project are below the levels considered to be significant by regulatory agencies, the City also recognizes that the highest acute health hazard index from the project will be in Bayview/Hunters Point. To address these concerns, the City is developing, with community input, a PM_{10} mitigation/community benefits package. The City will target the mitigation to the areas affected by the impacts from the project.

3.4.3 The SFERP Will Improve Reliability

Maintaining reliability is one of the primary justifications for the SFERP. The SFERP will support reliable electric service in San Francisco and the peninsula by replacing old unreliable units nearing the end of their useful life with a new highly-reliable technology. The CAISO has already revised the planning standards that apply in the GBA to address the fact that the older, less reliable generating units in the GBA justify the application of a more stringent criteria for that area (CAISO, 2002). Nonetheless, the concern remains that the City's electric reliability is compromised by reliance on old, undependable generation to meet planning standards.

In 2003, the City evaluated the relative reliability of in-City generation as compared to the average reliability of other generating units within the CAISO system. This evaluation was based on publicly available information on the status of generating units posted four times a day on the CAISO website (The CAISO declined to provide hourly unit availability information to the City for this effort).

The evaluation used data from July 10, 2001 through September 20, 2003 and added the time periods when units were curtailed and the amount of the curtailment.[2] The results of these calculations were used to determine the average MW curtailed for each unit within the CAISO system during the time period reviewed, and the equivalent outage rate.

The analysis showed that the average outage rate for all units other than the San Francisco/peninsula units is 0.05 (i.e., they were unavailable 5 percent of the time); whereas the average outage rate for units in San Francisco and the peninsula is 0.14. Even without considering the Hunters Point Power Plant, the average outage rate for units in San Francisco is 0.11.[3] This means that City/peninsula units, on average, are more than twice as likely to be unavailable to serve load than the units reported for other areas of the CAISO grid. Potrero Unit 3, by itself, has an average outage rate of 0.12, or more than twice the average outage rate of other units in the CAISO system.

The results of the evaluation are consistent with findings by the CEC reported in the 2003 Integrated Energy Policy Report published December 2003. In that report, the CEC indicated that, "Despite recent improvements in the electricity market as a whole, the Energy Commission is concerned about local reliability in San Diego and the San Francisco peninsula. Both areas experienced serious reliability problems during the energy crisis" (CEC, 2003).

The evaluation of unit outages coupled with the CEC data indicate that it is not necessarily sufficient to apply the CAISO Planning Standards to determine whether reliable electric service will be provided to electric consumers on the San Francisco and the peninsula. The data supports a further conclusion that additional resources are needed now to provide a level of reliability even close to that enjoyed in other areas of California.

In contrast to the old and unreliable generation that currently operates in the City, the SFERP involves new aeroderivative combustion turbine technology. This technology has a very high availability record. Replacing old generation that is more than twice as likely to be unavailable than the average, with this new highly reliable technology will substantially enhance San Francisco/peninsula electrical reliability.

3.4.4 The SFERP Complements a Portfolio of Energy Efficiency, Renewable Resources, and Clean Distributed Generation

The SFERP complements City efforts to develop energy efficiency improvements, renewable resources, and clean distributed generation. To provide for reliable operations, the transmission network in the City and the peninsula needs generation that is both dispatchable and properly located to benefit the network. The SFERP's size and configuration enables maximum deployment of energy efficiency improvements, renewable resources and clean distributed generation. Because of its flexibility, the SFERP can be used to complement intermittent renewable resources such as wind. Therefore, at the same time as it is developing the SFERP, the City is aggressively implementing programs to promote energy efficiency and renewable resources.

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[2] The analysis excluded data from January 1, 2001 through July 9, 2001 because the data for these dates contained insufficient information and had formatting problems.

[3] Hunters Point Unit 4 is the most unreliable of the City plants with an outage rate of 0.30, or six times the average outage rate of other units in the CAISO system.

The SFERP, energy efficiency improvements and renewable energy projects are all critical and compatible components of a portfolio of resources to serve San Francisco. The City is continuing to move forward aggressively with initiatives to fund, develop and implement energy efficiency and renewable resources as it develops the SFERP. In 2001, the City created the Mayor's Energy Conservation Account (MECA), which directed $15 million to finance aggressive energy efficiency and renewable energy programs in city buildings and facilities. Since that time, an additional $25 million has been allocated to the MECA fund. Completed energy efficiency projects include combined solar and energy efficiency improvements at the Moscone Convention Center project. A list of the projects completed through the MECA is set forth in Appendix 3.

The City, through the San Francisco Department of the Environment, is also working with PG&E to implement a $16 million program, the San Francisco Peak Energy Pilot Program, to increase electric reliability by reducing peak energy demand in San Francisco by 16 MW by 2005. The program offers energy saving opportunities for residential and business customers in San Francisco.

As for renewables, the City has installed a 675 kW solar project on the Moscone Center in combination with energy efficiency measures. Projects are also planned for the Southeast Water Pollution Control Plant, Pier 96 and other locations. These projects are projected to result in a peak demand reduction of 1.1 MW. In addition, the City is implementing a new solar project called Generation Solar to support the development of the solar energy market. The program will provide at least 100 residential and commercial participants with turnkey installation and financing of photovoltaic systems and accompanying energy-conservation measures. The City also has installed 3 MW of renewable bio-gas cogeneration at its wastewater treatment plants.

The City is also supporting energy efficiency and renewables through its Environmental Justice grants program. The program provides funding to local non-profit organizations and businesses to promote energy efficiency, home weatherization and solar projects in the Potrero and Bayview-Hunters Point neighborhoods. With support from this program, forty solar systems have been installed and more than 400 homes, businesses and non-profit organizations have received weatherization and energy efficiency measures.

3.4.5 The SFERP Will Support Affordable Electric Bills

The SFERP could reduce costs from the operation of existing in-City generation. Because it is comprised of small flexible quick start units, the SFERP will eliminate the need to operate Potrero Unit 3 around the clock merely to ensure that a reliability unit is available to meet needs during peak hours.

3.4.6 The SFERP Will Increase Local Control Over Energy Resources

The City will own the SFERP. As the City is accountable to its citizens, this ownership model will increase local control of key energy resources. Further, local control should reduce the exposure of San Francisco ratepayers and more broadly the ratepayers of PG&E to the exercise of local market power from in-City generation. Pursuant to a 10-year power purchase agreement between the California Department of Water Resources and the City, the output of the SFERP will be used to serve all PG&E customers. This approach is preferable to having new strategically located generation in the hands of private entities

with a profit incentive. Absent local control, the market power of such entities would only be curbed by imperfect FERC-approved market power mitigation measures.

3.5 References

CAISO. 2002. California ISO Planning Standards. February 7.

CAISO. 2003a. San Francisco Peninsula Load Serving Capability, Draft Version 2.0. October 24.

CAISO. 2003b. Reliability Must-Run Study Report, Final Version: Appendix 5, Greater Bay Area. May 19.

City and County of San Francisco. 1998. Agreement Between the City and County of San Francisco and Pacific Gas and Electric Company to Close the Hunters Point Power Plant. July 9, 1998.

California Energy Commission (CEC). 2002. Potrero Power Plant Unit 7, Final Staff Assessment section 6.6-7, CEC docket 00-AFC-4. April 4.

California Energy Commission (CEC). 2003 Integrated Energy Policy Report. December.

DeShazo, Gary. 2003. Testimony of Gary DeShazo on behalf of the California Independent System Operator, CPUC docket A.02-09-043. October 10.

Edwards, Marcie. 2004a. Interim CEO, CAISO, memorandum to the CAISO Board of Governors: Action Plan for San Francisco, Options and Risks. September 10.

Edwards, Marcie. 2004b. Interim CEO, CAISO, memorandum to the CAISO Board of Governors: Board Endorsement of Revised Action Plan for San Francisco. November 5.

Kott, Robert. 2004. Manager of Reliability Contracts, CAISO, memorandum to the CAISO Board of Governors: RMR Designations for 2005. September 10.

Mirant Delta, LLC and Mirant Potrero, LLC. 2005. Offer of Partial Settlement, FERC Docket No. ER05-343-001. January 7.

PG&E. 2003a. Transmission and Generation Interconnection Projects status report, Item No. 84, filed in CPUC docket 00-11-001. September 2.

PG&E. 2003b. Transmission and Generation Interconnection Projects status report, Item No. 93, filed in CPUC docket 00-11-001. September 2.

PG&E. 2003c. Transmission and Generation Interconnection Projects status report, Item No. 78, filed in CPUC docket 00-11-001. September 2.

PG&E. 2003d. Direct Testimony of Pacific Gas and Electric Company Regarding the Need for the Jefferson-Martin 230-KV Transmission Project in CPUC Docket No. A02-09-043. October 10.

R.W. Beck, et al. 2002. Final Report Energy Services Study, San Francisco Local Agency Formation Commission. July 18.

Rubenstein, Gary. 2004. Personal communication with Jeanne Solé. Based on BAAQMD Data. February 20.

San Francisco Board of Supervisors. 2001. Ordinance No. 124-01 on human health and environmental protections for new electric generation. May 21.

San Francisco Board of Supervisors. 2002. Resolution No. 827-02: endorsing the electricity resource plan for San Francisco, December 9.

San Francisco Public Utilities Commission (SFPUC) and San Francisco Department of Environment. 2002. The Electricity Resource Plan: Choosing San Francisco's Energy Future, Revised December.

San Francisco Public Utilities Commission. 2003. White Paper: The San Francisco Electrical Reliability Power Project. July 31.

Winter, Terry M. 2003a. President and Chief Executive Officer, CAISO, Letter to Kevin Dasso and Theresa Mueller. April 18.

Winter, Terry M. 2003b. President and Chief Executive Officer, CAISO, Letter to Supervisor Sophie Maxwell. October 22.

SECTION 4.0

Environmental Justice

SECTION 4.0

Environmental Justice

4.1 Introduction

California law defines environmental justice (EJ) as "the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies" (Government Code Section 65040.12). The City and County of San Francisco (CCSF) supports the goals of environmental justice and is committed to promoting social justice and equality in the context of environmental policymaking and its administrative and regulatory programs. The San Francisco Electric Reliability Project (SFERP) is an important project to facilitate the closure of existing in-City generation while maintaining electric reliability.

4.2 The City's Current Policy on Environmental Justice and New Generating Facilities in Southeast San Francisco

In May 2001, the San Francisco Board of Supervisors adopted Ordinance No. 124-01 establishing City policy for the development of electrical generating units at the Potrero Power Plant in Southeast San Francisco. In that ordinance, the Board of Supervisors found that:

(A) The Energy Resources Conservation and Development Commission (California Energy Commission [CEC]) has recognized Southeast San Francisco as a minority community entitled to environmental justice.

(B) All of the major electrical generating units in San Francisco are located in Southeast San Francisco, which includes the Bayview, Hunters Point, Potrero Hill, and Dogpatch neighborhoods.

(C) Southeast San Francisco has a disproportionate number of industrial and polluting facilities.

(D) Southeast San Francisco has an extraordinarily high rate of childhood asthma and other serious respiratory diseases.

(E) Fossil fuel generation is associated with pollutants that damage public health.

(F) Oil-fueled generation, such as that produced by the Potrero Power Plant Units 4, 5, and 6 known as "Peakers," is potentially more harmful than natural gas-fueled generation.

(G) Alternative fuel sources are more protective of the environment and human health than fossil fuel generation.

(H) The City signed an agreement with PG&E calling for the permanent shutdown of the Hunters Point Power Plant, as determined by the appropriate state and federal

regulatory authorities, as soon as the facility is no longer needed to sustain electrical reliability.

(I) The California Independent System Operator has identified transmission upgrades that would assist with providing reliable electricity to San Francisco.

(J) The City has agreed with PG&E to advocate the expeditious development of capacity (generation and/or transmission), which minimizes adverse community and environmental impacts to replace the Hunters Point Power Plant.

This series of findings sets forth unambiguously the City's view that Southeast San Francisco is a community of color with relatively high rates of serious respiratory diseases; and that the Southeast San Francisco has been disproportionately impacted by industrial facilities including electric power generation.

Ordinance 124-01 goes on to set forth a series of requirements for any new fossil-fueled power generation at the Potrero Hill Power Plant in Southeast San Francisco. The requirements are designed to minimize adverse impacts from additional power plant development in the region. The requirements stress (1) reduction of potential and actual emissions of criteria, toxic and hazardous air pollutants; (2) closure of Hunters Point Power Plant; (3) limiting or eliminating the operation of the peaking units at the Potrero Power Plant; (4) cleanup and eventual shut down of Potrero Power Plant Unit 3; and (5) mitigation of the adverse social, economic, cultural, environmental, and public health impacts from the new generation on the impacted communities in Southeast San Francisco. Ordinance 124-01 provides that any agreement by City officials or departments for or related to new electric generation in San Francisco shall require approval of the Board of Supervisors. Ordinance 124-01 also provides for the development of an Energy Resource Plan to implement all practical transmission, conservation, efficiency and renewable alternatives to fossil fueled generation in the City. Although the SFERP is no longer proposed to be sited at the Potrero Hill Power Plant, Ordinance 124-01 still provides general policy guidance about the City's objectives for the development of generation in Southeast San Francisco.

4.3 The SFERP Supports the Objectives of Ordinance 124-01

Section 3.0, Purpose and Need, describes how the SFERP supports closure of existing dirty generation within Southeast San Francisco, as a component of a portfolio of resources that includes transmission, energy efficiency improvements, renewable resources, and clean distributed generation. As that section explains, a primary purpose of the City in developing the SFERP is to provide for closure of existing old dirty generation in the City while maintaining electrical reliability. Closure of existing dirty generation within Southeast San Francisco will eliminate a significant source of pollution that affects the local communities.

Nonetheless, the City recognizes that the SFERP, while significantly cleaner than existing generation, could have adverse air quality and public health impacts that must be minimized. Accordingly, the City has designed into the SFERP a variety of features to ensure that the SFERP supports the objectives set forth in Ordinance 124-01 and meets the requirements of the California Environmental Quality Act, as follows:

(1) Reduction of potential and actual emissions of criteria, toxic and hazardous air pollutants.

Although under Bay Area Air Quality Management District (BAAQMD) air quality rules the City is only required to offset oxides of nitrogen (NO_X) emissions from the SFERP on a 1.15 to 1 basis, the City will offset emissions of both NO_X at a 1.19 to 1 basis. The City has obtained an option to procure local emission reduction credits (ERCs) to fulfill this commitment. In this manner, the City will assure that it is not exchanging impacts from the SFERP to the local San Francisco communities for benefits from ERCs that were created in distant communities in the BAAQMD. Consistent with BAAQMD rules, the City will install best available control technology (BACT) on the SFERP to reduce plant emissions to the greatest extent possible. Emissions from the SFERP will be monitored using BAAQMD-approved continuous emission monitors for NOx and carbon monoxide (CO). In addition, although the modeling shows that the SFERP is not expected to contribute significantly to cumulative regional or localized impacts of any air pollutant, including NO_2 and PM_{10}, there will be PM_{10} impacts from the SFERP in both Potrero and Bayview/Hunters Point. In addition, although the impacts of toxic air contaminants from the project are below the levels considered to be significant by the regulatory agencies, the City recognizes that the highest acute health hazard index from the project will be in Bayview/Hunters Point. To address these concerns, the City is developing, with community input, a PM_{10} mitigation/community benefits package as described below. The City will target the mitigation to the areas affected by the impacts from the project.

(2) Elimination of the Need for Existing in-City Generation.

As is explained in Section 3, Purpose and Need, the SF Action Plan approved by the Board of the California Independent System Operator (CAISO) sets forth the requirements to eliminate the need for all existing in-City generation. The Hunters Point Power Plant should be closed prior to the in-service date of the SFERP, with the construction of the 230-kV Jefferson-Martin transmission line and a series of additional transmission projects that are currently underway. Once the requirements for closure of Hunters Point Power Plant are in place, the Reliability-Must-Run (RMR) agreement for Potrero Unit 3 can be terminated with the installation of the SFERP and a fourth City-owned combustion turbine at the San Francisco International Airport. With the requirements for elimination of the RMR Agreement for Potrero Unit 3 in place, the RMR Agreement for Potrero Units 4, 5 and 6 can be eliminated with four further transmission projects that should be completed by the end of 2007. The removal of the RMR Agreement from units at the Potrero Power Plant would eliminate an important source of revenue to Mirant from continued operation of the units and would allow the owner (Mirant Potrero, LLC) to shut down the plant.

(3) Mitigation of the adverse social, economic, cultural, environmental and public health impacts from the new generation on the impacted communities in Southeast San Francisco.

The City is committed to mitigating the impacts from the SFERP on the Southeast San Francisco communities. In addition to minimizing the emissions from the SFERP, as

described above, the City is in the process of developing a mitigation community benefits plan for particulate matter smaller than 10 microns (PM_{10}).

During 2003, the City consulted extensively about the SFERP with community members and hosted several public meetings to introduce and discuss the project. Input from these meetings and from Supervisor Maxwell, who represents the Potrero, Hunters Point, and Dogpatch neighborhoods, provided the basis for certain features of the SFERP designed to reduce impacts on the community:

(a) The City is siting one of the four combustion turbines available for development away from Southeast San Francisco at the San Francisco International Airport.

(b) The City will use recycled water for cooling at the SFERP. Hence, the City will significantly reduce the use of potable water at the plant and avoid any impacts from use of Bay waters.

(c) The City is working with the affected communities to develop a PM_{10} mitigation and community benefits package to offset remaining impacts from the SFERP. Additional details about the process to develop this package are presented below.

Thus, the SFERP generally meets the objectives set forth in Ordinance 124-01. Moreover, before the SFERP is constructed, the project will be presented to the Board of Supervisors for approval of financing and contractual arrangements. At that time, the Board of Supervisors will have the opportunity to determine whether the features of the SFERP, including the PM_{10} mitigation/community benefits program, adequately satisfy the objectives for development of generation set forth in Ordinance 124-01.

The City is aware that typically the California Energy Commission requires an assessment of Environmental Justice pursuant to President Clinton's Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994). Although it has not formulated a formal environmental justice policy, the CEC has established an approach in preparing an Environmental Justice Analysis. Appendix 8.8A undertakes such an analysis in a manner that is generally consistent with the CEC's approach solely for the purpose of meeting the CEC's data adequacy requirements.

4.4 PM_{10}/Community Benefits Program

In addition to offsetting the NO_x and POC emissions from the SFERP as described earlier, the City is committing to offset the estimated 18.2 tons per year of PM_{10} emissions from the project. This commitment is consistent with recent CEC permitting cases that provide for the mitigation of the impacts of PM_{10} emissions and other community public health concerns. (See CEC decisions for the Pico Power Project, the Metcalf Energy Center, the Tracy Peaker, and Tesla Power Project.) To develop a PM_{10} mitigation/community benefits program that both addresses the project impacts and the environmental and public health concerns of the affected Potrero and Bayview-Hunters Points communities, the City has held two public workshops and a number of meetings with interested members of the community. Project staff has also attended a number of community and other meetings, including meetings of the Power Plant Task Force, the Dogpatch Community Association, the Environmental Subcommittee of the Bayview Project Area Committee, and the Policy Committee of the

City's Commission on Environment. Public comment on potential mitigation measures was also received via mail and email submissions. These activities afforded members of the public an opportunity to provide input into the availability, feasibility and relative merit of options for mitigation. The meetings and workshops were attended by a diverse group of participants representing the residential and commercial sectors of the Dogpatch, Potrero, and Bayview-Hunters Point neighborhoods, as well as local environmental groups, governmental agencies interested in the SFERP, and the general public.

Through these activities, and additional work and analysis by City staff and consultants, a list of 47 possible actions was identified that could either mitigate PM_{10} emissions from the SFERP or otherwise enhance the quality of life in the affected communities. Project staff evaluated each of the 47 possible actions to determine their feasibility and potential to reduce PM_{10} emissions. This list was further screened to eliminate actions that would duplicate the implementation of pending regulation changes, such as the Air Resources Board's proposed regulation of truck refrigeration units. The remaining short list of possible actions that could be considered for a PM_{10} mitigation program for SFERP are listed below:

- Street sweeping of traffic lanes on high traffic streets
- Replacing wood fireplaces
- Sodding or paving high traffic areas
- Vehicle scrappage

With some further analysis and public workshops, the project staff will finalize a recommendation for a PM_{10} mitigation/community benefits package and present their recommendation to the San Francisco Public Utilities Commission and the Policy Committee of the San Francisco Environmental Commission for their input and comment. The City will present a final proposal to the CEC in June 2005.

Through funding from sources unrelated to the SFERP, the City has fielded additional programs to improve the quality of life in Southeast San Francisco, and has and will continue to give consideration to some of the 43 remaining actions identified in the community workshops as potential community benefit projects. Moreover, in the context of evaluating PM_{10} mitigations, San Francisco Department of Public Heath (SFDPH) staff suggested greater consideration of transportation demand reduction strategies. Such strategies can include improvements to the pedestrians and bicyclists—transit linkages. SFDPH staff support such strategies as they have multiple simultaneous public health and environmental benefits, in addition to benefits on air quality. Consideration and evaluation of these strategies was unfortunately not possible for purposes of a PM_{10} mitigation program associated with the SFERP because of the limited cost-benefit evaluation data available on demand reduction strategies. Further investigation of these strategies and investigation of available cost-benefit data would have merit in the context of ongoing City efforts to improve air quality in Southeast San Francisco.

4.5 Air Monitoring

Another City project that is unrelated but relevant to the SFERP involves air monitoring. The City is working with air agencies to collect and evaluate air monitoring data in an attempt to determine the overall air quality in the southeast communities of San Francisco.

The data will help the City continue to develop programs and activities to reduce air pollution in the Southeast area.

Specifically, the City is working in a collaborative partnership with the BAAQMD and the California Air Resources Board to temporarily operate a local air quality monitoring station in the Hunters Point community. The monitoring station, located at Whitney Young Circle at Hudson and Progress streets in San Francisco, is collecting data on criteria and toxic air pollutants for a period of 12 months. Data are being evaluated and compared with the pollutant measurements for the same period obtained by BAAQMD at its permanent monitoring stations in the Bay Area, especially the one located on Arkansas Street in the Potrero neighborhood of San Francisco. This comparison will help to determine if there are any significant local variations in the ambient air quality between the monitoring locations. The air monitoring information will also provide a basis to assess the need for additional programs to improve air quality in Southeast San Francisco. A comparison of preliminary data collected at the Bayview Hunters Point Community Air Monitoring Project (BayCAMP) during the first 6 months of operation, July through December 2004, with historical data collected at the BAAQMD Arkansas Street monitoring station is presented in Table 8.1-25. The comparison indicates that the air concentrations of criteria pollutants in the vicinity of BayCAMP are comparable to those in the vicinity of the Arkansas Street monitoring stations.

SECTION 5.0

Electric Transmission

SECTION 5.0

Electric Transmission

5.1 Introduction

Section 5.0 discusses the transmission interconnection between the San Francisco Electric Reliability Project (SFERP) and the existing electrical grid, and the anticipated impacts that operation of the facility will have on the flow of electrical power in the San Francisco region of California. To better understand the impacts of the proposed SFERP on transmission and power flows, the discussions in this section focus on those areas that allow a critical review of the electrical transmission and interconnection. More specifically, this analysis will contain discussions of:

- The proposed electrical interconnection between SFERP and the electrical grid
- The proposed electrical transmission line alignment
- The impacts of the electrical interconnection on the existing transmission grid
- Potential nuisances (electrical effects, aviation safety, and fire hazards)
- Safety of the interconnection
- Description of applicable laws, ordinances, regulations, and standards (LORS)

The proposed SFERP site is located in an industrial area of the City and County of San Francisco (CCSF), California. This location was selected, in part, for its proximity to the Pacific Gas and Electric Company's (PG&E's) Potrero Switching Substation. Figure 5-1 (all figures are located at the end of this section) shows the location of SFERP in relationship to the Potrero Substation. This location, near the Potrero substation, will allow for short interconnecting transmission lines to SFERP.

The SFERP 115-kilovolt (kV) transmission line will be directly connected to PG&E's transmission system through the Potrero Substation. Two interconnections to the substation will be constructed by using two existing switchyard bays. There are currently three bays available for 115-kV lines in the switchyard located north of Humboldt Street.

5.2 Transmission Interconnection

SFERP will link to the power grid through the PG&E Potrero Substation by two redundant three-phase 115-kV solid dielectric underground transmission circuits. The proposed 115-kV route will exit north from SFERP into 25th Street and then proceed west along 25th Street until turning north into Michigan Street. The transmission line will turn west from Michigan Street into 24th Street. The line will intersect Illinois Street and continue north to the PG&E Potrero Switchyard. PG&E is currently performing a Facilities Study to evaluate the feasibility of two alternatives to route the transmission line from Illinois Street to the Potrero switchyard. The two alternatives are to (1) enter the Potrero switchyard underground from Illinois Street or (2) continue north to 22nd Street and enter the switchyard from 22nd street. If the 22nd Street route is selected, the circuits would then run east in 22nd Street to an underground/overhead transition structure located on the eastern portion of the

switchyard. An overhead line would then connect with the switchyard bus in an overhead arrangement.

The preferred method of construction will be the use of an open trench. In the intersections of Illinois Street with 23rd and 24th streets, there are numerous existing utilities to be avoided. In these cases, jack-and-bore construction techniques may be the most suitable construction approach. The final decision on construction methodology will be developed during the detailed design phase.

From the SFERP switchyard to the connection at the Potrero Substation breakers, the total transmission distance is approximately 3,000 feet. This is the most direct route, without going through private property, between SFERP and the PG&E switchyard.

5.3 SFERP Switchyard

The SFERP switchyard will contain five 115-kV, sulfur-hexafluoride- (SF_6) insulated, dead-tank, high-voltage circuit breakers in a 3-phase ring bus configuration. The main conductors of the ring bus and connections to the generator step-up transformers will be uninsulated tubular aluminum bus bars supported on steel structures with porcelain insulators. Each transformer will connect to a separate node of the ring. The two 3-phase circuits connecting the SFERP switchyard with the Potrero Substation will also be connected to separate nodes on the ring. Two aboveground to underground transition structures will be used to transition these circuits from the open bus work to the underground transmission cables. For operational flexibility and maintenance, 3-pole disconnect switches will be located on each side of each breaker and between each transformer and the ring bus.

Appropriate voltage and current sensing instruments will be provided on the ring bus, and the connections to the ring bus provide complete metering and electrical protection. The ring bus will be supported by a comprehensive protective relaying scheme, including over current and differential current relaying, to ensure a fast response to abnormal conditions that will isolate the affected area and permit continued service of the unaffected parts of the bus. The circuit breaker controls and protective relays will be housed in a relay panel located in the main control room. The switchyard will also be monitored through the plant control system where breaker position and system parameters will be available to the operator in the main control room. The plant control system will also display all alarm conditions associated with the switchyard.

5.4 Interconnection System Impact Study

The City of San Francisco (City) submitted a completed Interconnection Application (IA) to the California Independent System Operator Corporation (CAISO) for the SFERP. The proposed project at that time consisted of four LM6000 units rated at 48.7 megawatts (MW) each and one steam turbine rated at 15 MW. The maximum output of the proposed project would have been 209.8 MW. The online date of the proposed project was June 2005. Since the new plant arrangement with 3 simple-cycle LM6000 combustion turbines will have a lower output, the impact to the grid and PG&E local system is less. Therefore, a new system impact study was not required.

The proposed project will be connected to PG&E's transmission grid via new 115-kV generation tie lines. The System Impact Study (SIS) report presented the results for a plant of four LM6000 units and the one steam unit that would connect directly to PG&E's Potrero 115-kV Substation. A copy of the SIS was presented in Appendix 5A of the AFC.

This SIS identified:

- Transmission system impacts caused solely by the addition of the plant as described above
- System reinforcements, if any, necessary to mitigate the adverse impact under various system conditions

To determine the system impacts caused by the addition of the SFERP, studies were performed using the following full loop base cases:

- 2005 Summer Peak
- 2005 Fall Peak

The studies performed included:

- Steady State Power Flow
- Dynamic Stability Analysis
- System Protection

PG&E's evaluation was based on the assumption that Mirant Corporation's proposed Potrero Unit 7 project would not be built. At the time the system impact study was conducted, the City was proposing to locate the SFERP on the same location as that proposed for Potrero Unit 7. The City considers that it remains appropriate to assume that Potrero Unit 7 will not be built since the AFC for the facility is suspended, Mirant is in bankruptcy proceedings, and it is formal City policy to oppose the construction of Potrero Unit 7. PG&E's evaluation concluded that the addition of the SFERP would cause no normal overloads during conditions studied for 2005, provided that Potrero 7 is not online. The study showed that the project would exacerbate one transmission facility overload following Category B contingencies in the 2005 Summer Peak Base Case and none in the 2005 Fall Peak. Following Category C contingencies, the project would cause no overloads during the 2005 conditions studied. Mitigation of the pre-project and post-project overloads will be accomplished by PG&E's Potrero-Hunters Point (AP-1, scheduled for December 2005) 115-kV project which will be online prior to the Summer 2007 operational date for the SFERP.

The Substation Evaluation identified no overstressed equipment associated with the SFERP.

Dynamic Stability Study results indicated that the transmission system's transient performance, relative to the CAISO grid planning standards, would not be affected by the SFERP following selected disturbances.

Based on the results of the SIS conducted for a significantly larger SFERP, the SFERP will not adversely affect the grid.

5.5 Transmission Line Safety and Nuisance

This section discusses safety and nuisance issues associated with the proposed electrical interconnection of SFERP with the electrical grid. Construction and operation of the proposed underground transmission lines will be undertaken in a manner to ensure the safety of the public as well as maintenance crews while supplying power with minimal electrical interference.

5.5.1 Electrical Clearances

The proposed underground transmission lines will be encased in conduits within a concrete duct bank. Minimum clearances from other buried objects are specified in the National Electric Safety Code (NESC) and California Public Utilities Commission (CPUC) General Order 128 (GO 128). Electric utilities, state regulators, and local ordinances may specify additional (more restrictive) clearances. The proposed SFERP transmission interconnections will be designed to meet all national, state, and local code clearance requirements.

5.5.2 Electrical Effects

The electrical effects of high-voltage transmission lines fall into two broad categories: corona effects and field effects. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona may result in radio and television reception interference, audible noise, light, and production of ozone. Corona is generally a principle concern with transmission lines of 345 kV and higher. Field effects are the voltages and currents that may be induced in nearby conducting objects. The project's use of shielded solid dielectric cable encased in an underground concrete duct bank will eliminate the corona and field effects.

5.5.3 Aviation Safety

Federal Aviation Administration (FAA) Regulations, Part 77 establishes standards for determining obstructions in navigable airspace and sets forth requirements for notification of proposed construction. These regulations require FAA notification for any construction over 200 feet in height above ground level. Notification is also required if the obstruction is less than the above-specified height and falls within any restricted airspace in the approach to airports. The closest airport is Oakland International Airport approximately 34,000 feet to the east and therefore further than the 20,000 feet required for notification.

Based on the height of the underground to aboveground transition structures (which will not be higher than existing structures at the Substation), FAA notification is not needed. Furthermore, there are a number of existing transmission lines in proximity that are of comparable or taller height. As a result of their location and height in relation to the above airfield, the structures of the proposed electrical transmission interconnection will pose no deterrent to aviation safety as defined in the FAA regulations.

5.5.4 Fire Hazards

The proposed 115-kV transmission interconnection will be designed, constructed, and maintained in accordance with CPUC General Orders that establish clearances from other natural and constructed structures as well as tree-trimming requirements to mitigate fire hazards. The Applicant will use trained and qualified maintenance personnel to maintain the interconnection corridor and immediate area of the switchyard in accordance with accepted industry practices that will include recognition and abatement of any fire hazards.

5.6 Applicable Laws, Ordinances, Regulations, and Standards

This section provides a list of applicable LORS that apply to the proposed transmission line, substations and engineering.

5.6.1 Design and Construction

Table 5-1 lists the applicable LORS for the design and construction of the proposed transmission line and substations.

TABLE 5-1
Design and Construction LORS

LORS	Applicability	Supplement A Reference
GO-128, CPUC, "Rules for Underground Electric Line Construction"	CPUC rule covers required clearances, grounding techniques, maintenance, and inspection requirements.	Subsection 5.4
Title 8 CCR, Section 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical installation and equipment to provide practical safety and freedom from danger.	Subsection 5.2
GO-52, CPUC, "Construction and Operation of Power and Communication Lines"	Applies to the design of facilities to provide or mitigate inductive interference.	Subsection 5.4
ANSI/IEEE 693, "IEEE Recommended Practices for Seismic Design of Substations"	Recommends design and construction practices.	Subsection 5.2
IEEE 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Recommends clearance practices to protect persons outside the facility from electric shock.	Subsection 5.3
IEEE 998, "Direct Lightning Stroke Shielding of Substations"	Recommends protections for electrical system from direct lightning strikes.	Subsection 5.3
IEEE 980, "Containment of Oil Spills for Substations"	Recommends preventions for release of fluids into the environment.	Subsection 5.3

5.6.2 Electric and Magnetic Fields

The applicable LORS pertaining to EMF interference are tabulated in Table 5-2.

TABLE 5-2
Electric and Magnetic Field LORS

LORS	Applicability	Supplement A Reference
Decision 93-11-013, CPUC	CPUC position on EMF reduction.	Subsection 5.5.2
GO-131-D, CPUC, "Rules for Planning and Construction of Electric Generation, Line, and Substation Facilities in California"	CPUC construction application requirements, including requirements related to EMF reduction.	Subsection 5.2
ANSI/IEEE 644-1994, "Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines"	Standard procedure for measuring EMF from an electric line that is in service.	Subsection 5.2

5.6.3 Hazardous Shock

Table 5-3 lists the LORS regarding hazardous shock protection that apply to the project.

TABLE 5-3
Hazardous Shock LORS

LORS	Applicability	Supplement A Reference
8 CCR 2700 et seq. "High Voltage Electrical Safety Orders"	Establishes essential requirements and minimum standards for installation, operation, and maintenance of electrical equipment to provide practical safety and freedom from danger.	Subsection 5.3
ANSI/IEEE 80, "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.	Subsection 5.3
NESC, ANSI C2, Section 9, Article 92, Paragraph E; Article 93, Paragraph C	Covers grounding methods for electrical supply and communications facilities.	Subsection 5.3

5.6.4 Communications Interference

The applicable LORS pertaining to communication interference are tabulated in Table 5-4.

TABLE 5-4
Communications Interference LORS

LORS	Applicability	Supplement A Reference
47 CFR 15.25, "Operating Requirements, Incidental Radiation"	Prohibits operations of any device emitting incidental radiation that causes interference to communications; the regulation also requires mitigation for any device that causes interference.	Subsection 5.3
GO-52, CPUC	Covers all aspects of the construction, operation, and maintenance of power and communication lines and specifically applies to the prevention or mitigation of inductive interference.	Subsection 5.3
CEC staff, Radio Interference and Television Interference (RI-TVI) Criteria (Kern River Cogeneration) Project 82-AFC-2, Final Decision, Compliance Plan 13-7	Prescribes the CEC's RI-TVI mitigation requirements, developed and adopted by the CEC in past citing cases.	Subsection 5.3

5.6.5 Aviation Safety

Table 5-5 lists the aviation safety LORS that may apply to the proposed construction and operation of SFERP.

TABLE 5-5
Aviation Safety LORS

LORS	Applicability	AFC Reference
Title 14 CFR, Part 77, "Objects Affecting Navigable Airspace"	Describes the criteria used to determine whether a "Notice of Proposed Construction or Alteration" (NPCA, FAA Form 7460-1) is required for potential obstruction hazards.	Subsection 5.5.3
FAA Advisory Circular No. 70/7460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting of obstructions as identified by FAA Regulations Part 77.	Subsection 5.3.3
PUC, Sections 21656-21660	Discusses the permit requirements for construction of possible obstructions in the vicinity of aircraft landing areas, in navigable airspace, and near the boundary of airports.	Subsection 5.5.3

5.6.6 Fire Hazards

Table 5-6 tabulates the LORS governing fire hazard protection for SFERP.

TABLE 5-6
Fire Hazard LORS

LORS	Applicability	Supplement A Reference
14 CCR Sections 1250-1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and electric conductor clearance standards, and specifies when and where standards apply.	Subsection 5.5.4
ANSI/IEEE 80, "IEEE Guide for Safety in AC Substation Grounding"	Presents guidelines for assuring safety through proper grounding of AC outdoor substations.	Subsection 5.3
GO-95, CPUC, "Rules for Overhead Electric Line Construction," Section 35	CPUC rule covers all aspects of design, construction, operation, and maintenance of electrical transmission line and fire safety (hazards).	Subsection 5.5

5.6.7 Jurisdiction

Table 5-7 identifies national, state, and local agencies with jurisdiction to issue permits or approvals, conduct inspections, and/or enforce the above-referenced LORS. Table 5-7 also identifies the associated responsibilities of these agencies as they relate to the construction and operation of SFERP.

TABLE 5-7
Jurisdiction

Agency or Jurisdiction	Responsibility
CEC	Jurisdiction over new transmission lines associated with thermal power plants that are 50 MW or more (Public Resources Code [PRC] 25500).
CEC	Jurisdiction of lines out of a thermal power plant to the interconnection point to the utility grid (PRC 25107).
CEC	Jurisdiction over modifications of existing facilities that increase peak operating voltage or peak kilowatt capacity 25 percent (PRC 25123).
FAA	Establishes regulations for marking and lighting of obstructions in navigable airspace (AC No. 70/7460-1G).
Local Electrical Inspector	Jurisdiction over safety inspection of electrical installations that connect to the supply of electricity (NFPA 70).
City and County of San Francisco	Establishes and enforces zoning regulations for specific land uses. Issues variances in accordance with zoning ordinances. Issues and enforces certain ordinances and regulations concerning fire prevention and electrical inspection.

FIGURE 5-1
LOCATION OF SFERP AND PG&E POTRERO SUBSTATION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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SECTION 6.0

Natural Gas Supply

SECTION 6.0

Natural Gas Supply

6.1 Introduction

This section discusses the natural gas supply for the San Francisco Electric Reliability Project (SFERP). Subsection 6.2 describes the proposed natural gas supply pipeline. The gas supply pipeline construction methods and metering station are described in Subsection 6.3. Pipeline operations are described in Subsection 6.4. Natural gas will be obtained from the Pacific Gas & Electric Company's (PG&E's) transmission pipeline located west of the project site at the intersection of 25th Street and Illinois Street (see Appendix 6). A new 12-inch-diameter pipeline will be constructed from the PG&E tap point on line 101 to the SFERP site. A meter station will be installed at the SFERP site.

6.2 Proposed Route

The proposed pipeline is approximately 900 feet long. The pipeline would run north from the SFERP metering station (located on the western side of the project site, adjacent to the San Francisco Municipal Railway (MUNI) Metro East site (see Figure 6-1 at the end of this section) to 25th Street. From there the pipeline will proceed 800 feet west to tie into the existing 24-inch PG&E gas pipeline in Illinois Street.

The specific location of the pipeline will be determined during detail design based upon the avoidance of existing pipelines and other buried utilities.

Construction primarily will be open trench with a construction corridor of approximately 50 feet. The construction corridor will be located in Illinois and 25th Streets, and on City of San Francisco- (City) owned property.

No other alternative routes were evaluated because of the proximity of the PG&E 24-inch gas pipeline to the SFERP site.

6.3 Construction Practices

6.3.1 Gas Pipeline

The natural gas pipeline will be constructed with a minimum of one crew working continuously along the route, with construction of the entire pipeline requiring a peak workforce of approximately 8 workers. Most major pieces of construction equipment will remain along the route during construction. As for the main site construction, the Port-controlled Western Pacific land to the east of the project site will serve as the location for storing pipe and other pipeline construction materials as well as construction parking. Pipeline construction will take approximately 1.5 months and is expected to begin toward the middle of 2006 following the start of project construction.

The pipeline will be constructed of alloyed carbon steel in accordance with the American Petroleum Institute (API) specification for gas pipeline. The pipe will have factory-applied corrosion-protection coating. Joints will be welded, inspected using x-ray, and wrapped with a corrosion-protection coating.

The construction of the natural gas pipeline will consist of the following:

1. **Trenching width** depends on the type of soils encountered and requirements of the governing agencies. The optimal trench will be approximately 18 inches wide and 48 inches deep. If loose soil is encountered, a trench up to 8 feet wide at the top and 2 feet wide at the bottom may be required. The pipeline will be buried to provide a minimum cover of 36 inches. The excavated soil will be piled on one side of the trench and used for backfilling after the pipe is installed. The pipeline will be installed through trenching at all locations except where boring or directional drilling is required to pass beneath other buried utilities.

2. **Stringing** consists of trucking lengths of pipe to the right-of-way (ROW) and laying them on wooden skids beside the open trench.

3. **Installation** consists of bending, welding, and coating the weld-joint areas of the pipe after it has been strung, padding the ditch with sand or fine spoil, and lowering the pipe string into the trench. Bends will be made using a cold bending machine or shop-fabricated as required for various changes in bearing and elevation. Welding will meet the applicable API standards and will be performed by qualified welders. Welds will be inspected in accordance with API Standard 1104. Welds will undergo 100 percent radiographical inspection by an independent, qualified radiography contractor. All coating will be checked for holidays (i.e., defects) and will be repaired before lowering the pipe into the trench.

4. **Backfilling** consists of returning spoil back into the trench around and on top of the pipe, ensuring that the surface is returned to its original grade or level. The backfill will be compacted to protect the stability of the pipe and to minimize subsequent subsidence.

5. **Plating** consists of covering any open trench in areas of foot or vehicle traffic at the end of a workday. Plywood plates will be used in areas of foot traffic and steel plates will be used in areas of vehicle traffic to ensure public safety. Plates will be removed at the start of each workday. Efforts will be made to minimize the length of open trench along the route.

6. **Hydrostatic testing** consists of filling the pipeline with potable water, venting all air, increasing the pressure to the specified code requirements, and holding the pressure for a period of time. After hydrostatic testing, the test water will be analyzed for pH and total dissolved solids (TDS) and discharged to the City's combined sewer system, unless the analysis shows that the water's pH and/or TDS exceeds the City's discharge criteria. In this case the water would be trucked to an appropriate treatment or disposal facility. The construction contractor will obtain all necessary approvals for test water use and discharge.

7. **Cleanup** consists of restoring the surface of the roadway or ROW by removing any construction debris, grading to the original grade and contour, and revegetating or repairing where required.

8. **Commissioning** consists of cleaning and drying the inside of the pipeline, purging air from the pipeline, and filling the pipeline with natural gas.

9. **Safety** consists of using PG&E's standard safety plan for the project. This plan addresses specific safety issues, traffic control, and working along City streets and other areas, as required by permits.

6.3.2 Metering Station

A gas-metering station will be required at the SFERP site to measure and record gas volumes. In addition, facilities will be installed to regulate the gas pressure and to remove any liquids or solid particles. The metering station will require an area of approximately 25 feet by 70 feet on the SFERP site.

Construction activities related to the metering station will include grading a pad and installing above- and belowground gas piping, metering equipment, gas conditioning, pressure regulation, and possibly pigging facilities. A distribution power line will also be installed to provide power for metering station operation lighting, communication equipment, and perimeter chain-link fencing for security.

6.4 Pipeline Operations

The proposed natural gas supply pipeline will be designed, constructed, and operated in accordance with 49 CFR 192 and CPUC General Order No. 112. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in populated areas. It will be installed with a minimum of 36 inches of cover as required by the Code of Federal Regulations.

PG&E's standard operations and maintenance plan will be in place, addressing both normal procedures and conditions and any upset or abnormal conditions that could occur. Periodic leak surveys and cathodic protection surveys will be performed along the pipeline, as required by 49 CFR 192. The pipeline will be continuously protected by a cathodic protection system. PG&E's standard emergency plan will provide prompt and effective responses to upset conditions detected along the pipeline or reported by the public. This plan is reviewed with local agencies annually.

PG&E has a proactive damage prevention program in place that will be applied to the pipeline. Markers identifying the location of the pipeline will be placed at all road crossings. The markers will identify a toll-free number to call before any excavation in the vicinity of the pipeline.

Isolation block valves will be installed at both ends of the pipeline. These valves will be manually controlled, lockable, gear-operated ball valves. PG&E will own and operate the metering facility to measure the gas supply to SFERP. A pipeline Supervisory Control and Data Acquisition (SCADA) system will provide flow rate and pressure data to PG&E and SFERP. Communication with PG&E gas line operations will be by dedicated telephone lines or other means, such as Cellular Digital Pocket Data (CDPD).

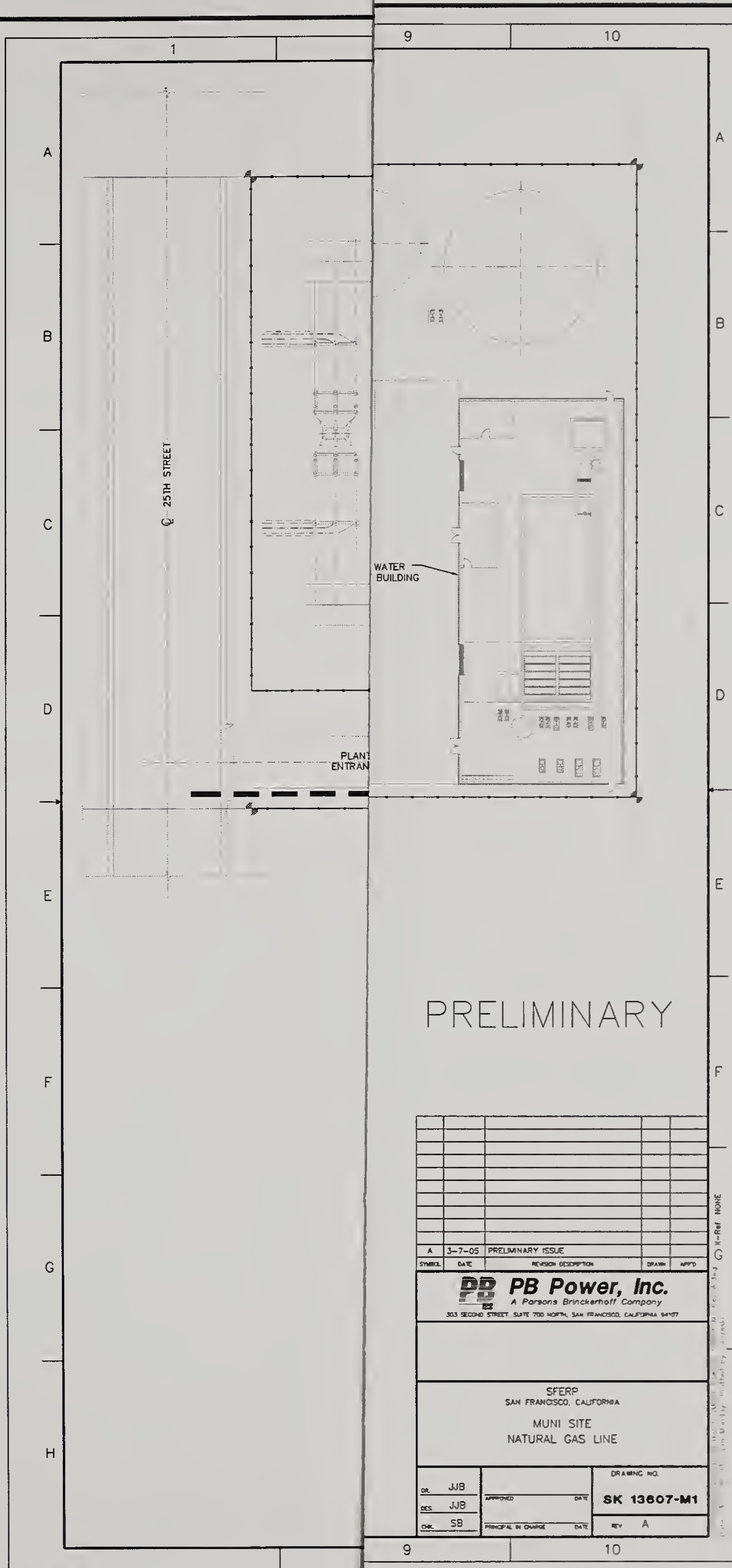

FIGURE 6-1
NATURAL GAS LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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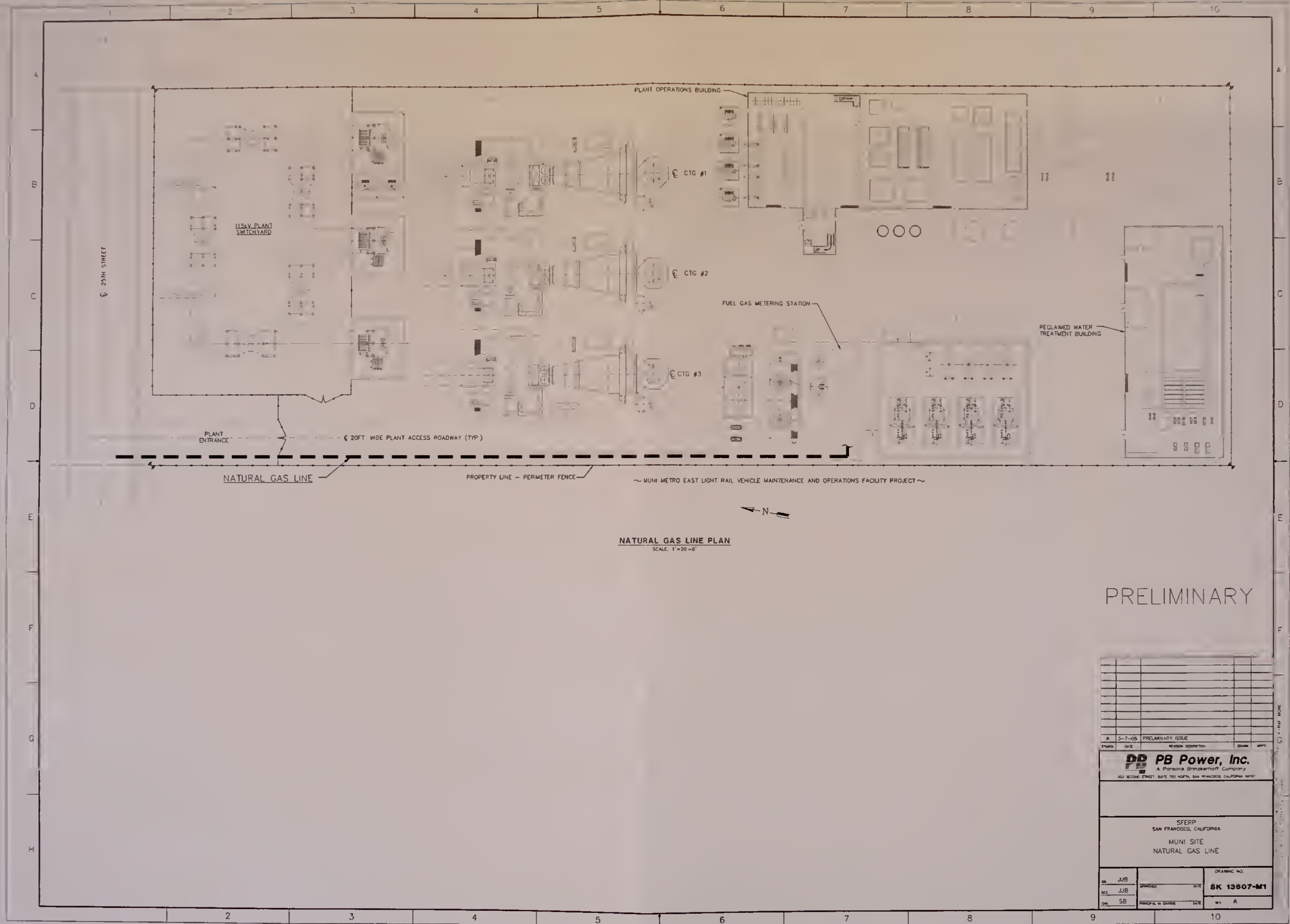


FIGURE 6-1
NATURAL GAS LINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

SECTION 7.0

Water Supply Pipelines

SECTION 7.0

Water Supply Pipelines

7.1 Introduction

This section describes the water supply pipeline route for the recycled and domestic water lines. The source of the water, its quality, and potential environmental impacts are discussed in Subsection 8.14, Water Resources.

Subsection 7.2 discusses the process water supply pipeline. Subsection 7.3 discusses the potable water line for potable supply, fire protection, and emergency supply. Subsection 7.4 discusses the pipeline construction practices.

7.2 Process Supply Pipeline

7.2.1 Process Water Supply

To provide a source of process water for the water treatment plant at the San Francisco Electric Reliability Project (SFERP) site, the City of San Francisco's (City's) combined sewer system will be intercepted at a collection station near Marin Street. A new underground pump station will be constructed on a City-owned parcel located on Marin Street. The pump station will include infrastructure to remove floatable matter and large debris prior to discharge into the process water pipeline. Excess flow and debris will be returned to the combined sewer system.

7.2.2 Pipeline Alignment

The initial reach of the pipeline will be constructed along Marin Street. It will extend approximately 80 feet, and will be installed using open trench excavation methods. The next portion of the alignment extends north from Marin Street along Mississippi Street for about 480 feet, and then east on Cesar Chavez Street for about 850 feet. This reach of the process water pipeline will be constructed within an existing collection box, which is part of the storage/transport system that captures stormwater runoff. At locations where there is insufficient room within the collection box, the pipeline will be constructed through open-trenching or a trenchless method, such as jack and bore or micro-tunneling. The existing collection box terminates near the intersection of Cesar Chavez Street and Indiana Street. The next and final portion of the pipeline will run about 2,340 feet east on Cesar Chavez Street, then 290 feet north on Maryland Street and then 200 feet west to the SFERP water treatment facility inlet structure, located on the southern boundary of the project site. This third portion of the pipeline will be installed using open trench excavation methods, or trenchless methods, where necessary.

The pipelines may have to be installed across Third Street and Illinois Street using trenchless methods, due to traffic concerns and many existing utility crossings. In Cesar Chavez and Maryland Streets, the pipeline will be located to avoid all known utilities. Along Cesar

Chavez Street, the alignment will stay on the south side to avoid water lines and other utilities located on the north side of the street.

7.3 Potable Water Pipeline

Potable water will be supplied to SFERP to meet minor potable water needs, fire protection demands, and emergency cooling and process backup supplies, as described in Subsection 8.14, Water Resources. The potable water source is the City's potable water distribution system, which provides a blend of Hetch Hetchy water from a protected watershed in the Yosemite National Park and the local area watershed water in San Mateo. An existing potable water pipeline of sufficient capacity is located in 25th Street, which will require the installation of approximately 300 feet of pipeline to supply water to the SFERP.

7.4 Construction Practices

Construction of the process water supply pipeline is expected to occur during months 4 through 7 of project construction. Total construction time is expected to be approximately 4 months.

The water pipelines will be constructed with one crew ("spread") working continuously along the pipeline right-of-way (ROW), performing pipe installation in the storage/transport and in open trenches. In addition, a second crew will perform microtunneling operations at the necessary locations. Workers will park along the pipeline corridor or at designated parking areas and be transported to the work site. The pipeline corridor will be accessed from existing roads. Most major pieces of construction equipment may remain along the alignment over the course of construction. Piping will be stored in the plant laydown areas or along the pipeline ROW. Construction will be undertaken in accordance with an environmental mitigation plan prepared for the project.

The construction of the wastewater pipelines will consist of the following activities:

- **Trenching**—It is expected that the pipeline can be installed in a relatively shallow trench, with a total excavation depth of approximately 7 feet. The width would be approximately 5 feet with allowance for clearance on both sides of the pipe and trench shoring and sheeting. Trench width will depend on the type of soils encountered and slope required by OSHA regulations. Trench depth will be sufficient to meet the requirements of the codes and agency having jurisdiction. Moreover, the pipeline will be buried to provide a minimum cover of 3 feet.
- **Jack and Bore/Microtunneling**—Jack and bore or microtunneling will be used at locations within the open-cut trench alignment reaches where there are facilities such as large box culverts without adequate clearance above, or to cross the future light rail tracks. Both of these methods will require a jacking pit and a receiving pit. The jacking pit would need to be approximately 30 feet long and 15 feet wide. At these crossings, a casing pipe would be installed by jack and bore or microtunneling. The pipes and any conduits for fiber optic cables will be bundled together with spacers and skids and then pushed into the empty casing. The excess material from this operation may be

contaminated and will be hauled to an appropriate area for disposal. The use of the jack and bore or microtunneling method will be dependent on the subsurface conditions.

- **Installation in the Collection Box** —The second portion of the pipeline will be installed and encased in concrete within the existing collection box and above the existing concrete-encased sewer lines. The installation within the collection box requires safety procedures specific to work within confined space. Prior to actual work within the structure, locations for discharge need to be identified. Temporary barriers at all inlets will be constructed to prevent flow into the structure during work. Prior to work within the structure, it will be pressure washed and ventilated, and proper lighting will be installed. Access holes will be cut into the top of the collection box near bends in the alignment so equipment and materials can be lowered into it. At each of these locations, temporary stairs will be placed for construction worker access.

- **Open-Trench Installation**—Installation of the water pipelines will consist of lowering the pipe string into the trench.

- **Stringing**—Stringing will consist of trucking lengths of pipe to the alignment corridor and laying them on wooden skids beside the open trench.

- **Backfilling**—It is anticipated that the excavated material will have unsuitable engineering properties to be used for backfill, and will therefore be hauled to an appropriate area for disposal. The trench may be backfilled with imported granular material or a flowable material such as controlled low strength material (CLSM). If CSLM were used, the trench could be narrowed to approximately 4 feet in width because of the backfilling characteristic of CSLM. Backfilling will consist of placing the selected fill material into the trench around and on top of the pipe, ensuring that the surface is returned to its original grade or level. The backfill will be compacted to protect the stability of the pipe and to minimize subsequent subsidence.

- **Plating**—Plating will consist of covering any open trench in areas of foot or vehicle traffic at the end of a workday. Plywood plates will be used in areas of foot traffic and steel plates will be used in areas of vehicle traffic to ensure public safety. Plates will be removed at the start of each workday. Efforts will be made to minimize the length of open trench along the alignment.

- **Hydrostatic Testing**—Hydrostatic testing will consist of filling the pipeline with water, venting all air, increasing the pressure to the specified code requirements, and holding the pressure for a period of time. After hydrostatic testing, the test water will be analyzed for pH and total dissolved solids (TDS) and discharged to the City's combined sewer system, unless the analysis shows that the water's pH and TDS exceeds the City's discharge criteria. In this case the water would be trucked to an appropriate disposal facility. Temporary approvals for test water use and discharge will be obtained, as required by the construction contractor.

- **Cleanup**—Cleanup will consist of restoring the surface of the backfilled trench by removing any construction debris, grading to the original grade and contour, and revegetating and repairing where required.

- **Safety**—A construction safety plan will be prepared for the project. This plan will address specific safety issues, such as working in an active railroad ROW, traffic control, working along traveled City or County streets, and other areas as required by permits.

SECTION 8.0

Environmental Information

SECTION 8

Environmental Information

The following sections, 8.1 through 8.16, provide the environmental information required:

SUBSECTION 8.1

Air Quality

8.1 Air Quality

The proposed San Francisco Electric Reliability Project (SFERP) consists of the installation and operation of three simple-cycle General Electric LM6000PC combustion turbines between 25th Street and Cesar Chavez Street at Michigan in the Potrero District of the City of San Francisco. The project will include one small two-cell cooling tower to provide inlet air chilling as necessary to maintain turbine output and auxiliary cooling as necessary. The nominal plant output will be 145 megawatts (MW).

This section of the Application for Certification (AFC) describes existing air quality conditions, maximum potential impacts from the project, and mitigation measures that keep these impacts below thresholds of significance. The project will use the latest, most efficient peaking generation technology to generate electricity in a manner that will minimize the amount of fuel needed, emissions of criteria pollutants, and potential effects on ambient air quality.

Other beneficial environmental aspects of the project that minimize adverse air quality include the following:

- Clean-burning natural gas as fuel
- Selective catalytic reduction (SCR) and combustion turbine water injection to minimize NO_x emissions
- Oxidation catalysts to reduce emissions of carbon monoxide and hazardous air pollutants
- Appropriately sized stacks to reduce ground-level concentrations of exhaust constituents

The SFERP will emit substantially less NO_x than existing in-City generation. In addition, the City has procured an option for local emission reduction credits to fully offset NO_x emissions from the SFERP. Although the modeling shows that the SFERP is not expected to contribute significantly to cumulative regional or localized air quality impacts of any pollutants, including NO_2 and PM_{10}, the City recognizes that there will be PM_{10} impacts from the SFERP in both Potrero and Bayview/Hunters Point. To address community concerns, the City is developing, with community input, a PM_{10} mitigation/community benefits package. The City will target the mitigation to the areas affected by the impacts from the project.

This section presents the methodology and results of the air quality analyses performed to assess potential impacts associated with air emissions from the project. Potential public health risks posed by emissions of non-criteria pollutants are also addressed in Subsection 8.6, Public Health.

Subsection 8.1.1 presents the air quality setting, including geography, topography, climate and meteorology. Subsection 8.1.2 provides an overview of air quality standards and health effects. Subsection 8.1.3 discusses the criteria pollutants and existing air quality in the vicinity of the proposed project. The affected environment is analyzed in Subsection 8.1.4, and air quality regulatory agencies relevant to the project are identified; the LORS that can

affect the project and project conformance are also identified in Subsection 8.1.4. Subsection 8.1.5 discusses the environmental consequences of emissions from the project and presents an overview of approaches for estimating facility impacts, modeling, and analysis. The screening health risk assessment, visibility screening analysis, and construction impacts analysis are also discussed. Subsection 8.1.6 discusses compliance with LORS applicable to the project. Subsection 8.1.7 notes that a cumulative air quality impacts analysis is included as Appendix 8.1F. Mitigation for project air quality impacts is discussed in Subsection 8.1.8. A list of references used in preparing the section is provided in Subsection 8.1.9.

8.1.1 Air Quality Setting

8.1.1.1 Geography and Topography

The project will be located on the east side of the City of San Francisco, near the San Francisco Bay in the Potrero District, between 25th Street and Cesar Chavez Street at Michigan. The project site is at an elevation of approximately 14 feet above sea level. The nearest residences are located within approximately 1,600 feet west of the project site. San Francisco Bay lies immediately east of the site.

8.1.1.2 Climate and Meteorology

The overall climate at the project site is dominated by the semipermanent eastern Pacific high-pressure system centered off the coast of California. This high-pressure system is centered between the 140° west (W) and 150° W meridians, and oscillates in a north-south direction. Its position governs California's weather. In the summer, the high-pressure system moves to its northernmost position, which results in strong northwesterly flow and negligible precipitation. A thermal low-pressure area from the Sonoran–Mojave Desert also causes air to flow onshore over the San Francisco Bay area much of the summer.

In the winter, the high-pressure system moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. About 80 percent of the region's annual rainfall of approximately 19.3 inches (City of San Francisco, 2005) occurs between November and March (U.S. Department of Commerce, Weather Bureau, 1959). During the winter rainy periods, inversions are weak or nonexistent, winds are often moderate, and the air pollution potential is very low. During summer and fall, when the Pacific high-pressure system becomes dominant, inversions become strong and often are surface-based; winds are light and the pollution potential is high. These periods are often characterized by winds that flow out of the Central Valley into the Bay Area and often include morning and evening fog.

Temperature, wind speed, and direction data have been recorded at a meteorological monitoring station at the nearby Potrero Power Plant (Potrero PP) at a station operated by PG&E in 1992. The average annual temperature is 62 degrees Fahrenheit (°F). The average July temperature is 64°F; winter temperatures average 56°F in January (City of San Francisco, 2005).

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the topography of the air basin, and local meteorological conditions. In the project area, stable atmospheric conditions and light winds can provide conditions for pollutants to accumulate in the air basin when emissions are produced. The predominant winds in California are shown in Figures 8.1-1 through 8.1-4 (all figures are at the end of this subsection). As indicated in the figures, winds in California generally are light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns at the project site can be seen in Figures 8.1-5a through 8.1-5e, which show annual and quarterly wind roses for meteorological data collected at the Potrero PP meteorological station during 1992. Wind frequency distribution tables are provided in Appendix 8.1B. These wind roses show that the winds are persistent (less than 1 percent calm conditions) and on an annual basis, predominantly from the west through the west-southwest (almost half the time). Winds are predominantly from the north and south during the winter months. The mixing heights of the area are affected by the eastern Pacific high-pressure system and marine influences. Often, the base of the inversion is found at the top of a layer of marine air, because of the cooler nature of the marine environment. Smith et al., (1984) reported that at Oakland, the nearest upper-level meteorological station (located approximately 10 miles east-southeast of the project site), 50th percentile morning mixing heights for the period 1979-1980 were on the order of 1,770 feet (530 to 550 meters) in summer and fall, and 3,600 to 3,900 feet (1,100 to 1,200 meters) in winter and spring. The 50th percentile afternoon mixing heights ranged from 2,150 and 3,030 feet (660 to 925 meters) in summer and fall, and over 3,900 feet (over 1,200 meters) in winter and spring. Such mixing heights provide generally favorable conditions for the dispersion of pollutants. Inland areas, where the marine influence is weaker, often experience strong ground-based inversions during cold weather periods. These inversions inhibit dispersion of low-lying sources of air pollution, such as cars, trucks, and buses, and can result in high pollutant concentrations.

8.1.2 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (USEPA) has established national ambient air quality standards (NAAQS) for ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with air pollution levels above these standards are considered "nonattainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (1 hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 8.1-1 presents the NAAQS and California ambient air quality standards for selected pollutants. The California standards are generally set at concentrations much lower than the federal standards, and in some cases have shorter averaging periods.

USEPA's new NAAQS for ozone and fine particulate matter went into effect on September 16, 1997. For ozone, the previous 1-hour standard of 0.12 parts per million (ppm) was replaced by an 8-hour average standard at a level of 0.08 ppm. Compliance with this standard will be based on the 3-year average of the annual fourth-highest daily maximum 8-hour average concentration measured at each monitor within an area.

TABLE 8.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour	0.09 ppm	0.12 ppm
	8 hours	–	0.08 ppm (3-year average of annual fourth-highest daily maximum)
Carbon Monoxide	8 hours	9.0 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	–	0.053 ppm
	1 hour	0.25 ppm	–
Sulfur Dioxide	Annual Average	–	80 $\mu g/m^3$ (0.03 ppm)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	365 $\mu g/m^3$ (0.14 ppm)
	3 hours	–	1,300* $\mu g/m^3$ (0.5 ppm)
	1 hour	0.25 ppm	–
Suspended Particulate Matter (10 micron)	Annual Arithmetic Mean	20 $\mu g/m^3$	50 $\mu g/m^3$
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$
Suspended Particulate Matter (2.5 micron)	Annual Arithmetic Mean	12 $\mu g/m^3$	15 $\mu g/m^3$ (3-year average)
	24 hours	–	65 $\mu\mu/m^3$ (3-year average of 98th percentiles)
Sulfates	24 hours	25 $\mu g/m^3$	–
Lead	30 days	1.5 $\mu g/m^3$	–
	Calendar Quarter	–	1.5 $\mu g/m^3$
Hydrogen Sulfide	1-hour	0.03 ppm	–
Vinyl Chloride	24-hour	0.010 ppm	–
Visibility Reducing Particles	8-hour (10 am to 6 pm PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	–

* This is a national secondary standard, which is designed to protect public welfare.

The NAAQS for particulates were revised in several respects. First, compliance with the current 24-hour PM_{10} standard will now be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Two new $PM_{2.5}$ standards were added: a standard of 15 microgram per cubic meter ($\mu g/m^3$), based on the 3-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the 3-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area. Finally, the state adopted a new, lower annual PM_{10} standard of 20 $\mu g/m^3$.

8.1.3 Existing Air Quality

To characterize existing air quality at the project site, ambient air quality readings were taken from a nearby air monitoring station on Arkansas Street, San Francisco. The station, which is less than 2 miles northwest of the project site, is operated by the Bay Area Air Quality Management District (BAAQMD). This station was used because of its proximity to the project site and because it records area-wide ambient conditions rather than the localized impacts of any particular facility. (A more extensive discussion of why the data from these stations are considered to be representative of air quality in the vicinity of the proposed project is provided in Subsection 8.1.5.3.1.) All ambient air quality data presented in this section were taken from CARB and USEPA publications and data sources. Although ambient data is being collected at the Bayview Hunters Point Community Air Monitoring Project (BayCAMP) monitoring station south of the proposed plant site, less than a full year of data is available from that site and so that data cannot be used to draw conclusions regarding long-term air quality trends in the area. A comparison of readings at Hunters Point and Arkansas Street is provided later in this subsection, in Table 8.1-24.

8.1.3.1 Ozone

Ozone is generated by a complex series of chemical reactions between precursor organic compounds (POC) and oxides of nitrogen (NO_x) in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summertime and lower in the wintertime. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges that trap the air mass, and exhaust emissions from millions of vehicles and stationary sources. Based upon ambient air measurements at stations throughout the area, the Bay Area Air Basin is classified as a nonattainment area for ozone.

Maximum ozone concentrations at the San Francisco station usually are recorded during the summer months. Table 8.1-2 shows the annual maximum hourly ozone levels recorded at the Arkansas Street monitoring station during the period 1994–2003, as well as the number of days in which the state and federal standards were exceeded. (Complete data for 2004 from the Arkansas Street station is not yet available.)

The long-term trends of maximum 1-hour ozone readings and violations of the state and federal standard are shown in Figure 8.1-6 for the Arkansas Street monitoring station. The data show that, on average, the state and federal ozone air quality standards have not been exceeded in the area in the past 10 years. Trends of maximum and 3-year average of the fourth highest daily concentrations of 8-hour average ozone readings and exceedances of the federal standard are shown in Figure 8.1-7. These levels are well below the federal

8-hour average standard. USEPA has proposed to redesignate the BAAQMD to an attainment area for the 1-hour federal standard; CARB has requested an initial designation of attainment for the BAAQMD for the 8-hour federal standard.

TABLE 8.1-2
Ozone Levels in San Francisco, Arkansas Street Monitoring Station, 1994-2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 1-Hour Average	0.055	0.009	0.071	0.068	0.053	0.079	0.058	0.082	0.054	0.085
Highest 8-Hour Average	0.045	0.067	0.050	0.059	0.046	0.057	0.043	0.054	0.049	0.059
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.12 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.08 ppm, 8-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005).

8.1.3.2 Nitrogen Dioxide

Atmospheric NO_2 is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. For purposes of state and federal air quality planning, the BAAQMD is in attainment for NO_2.

Table 8.1-3 shows the long-term trend of maximum 1-hour NO_2 levels recorded at Arkansas Street, as well as the annual average level for each of those years. During this period there has not been a single violation of either the state 1-hour standard or the NAAQS of 0.053 ppm.

TABLE 8.1-3
Nitrogen Dioxide Levels in San Francisco, Arkansas Street Monitoring Station, 1994-2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 1-Hour Average	0.091	0.088	0.081	0.067	0.080	0.103	0.074	0.073	0.075	0.072
Annual Average (NAAQS = 0.053 ppm)	0.022	0.021	0.021	0.020	0.020	0.021	0.020	0.019	0.019	0.018
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.053 ppm, annual arithmetic mean)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005).

Figure 8.1-8 shows the historical trend of maximum 1-hour NO_2 levels at Arkansas Street. The NO_2 levels are approximately one-third of the state standard.

8.1.3.3 Carbon Monoxide

CO is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors to ambient CO levels. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. Based upon ambient air quality monitoring, the Bay Area Air Basin is classified as being in attainment for CO.

Table 8.1-4 shows the California and federal air quality standards for CO, and the maximum 1- and 8-hour average levels recorded at the Arkansas Street monitoring station during the period 1994–2003.

TABLE 8.1-4
Carbon Monoxide Levels in San Francisco, Arkansas Street Monitoring Station, 1994–2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 1-hour average	5.8	5.3	5.4	4.8	7.1	5.4	5.5	4.0	3.5	3.6
Highest 8-hour average	4.40	4.44	3.8	3.45	3.96	3.68	3.19	3.28	2.57	2.84
Number of days exceeding:										
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (9.0 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9.3 ppm, 8-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005); USEPA AirData (USEPA, 2005).

Trends of maximum 1- and 8-hour average CO concentrations are shown in Figures 8.1-9 and 8.1-10, which show that maximum ambient CO levels at Arkansas Street have been well below the state standards for many years.

8.1.3.4 Sulfur Dioxide

SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains negligible sulfur, while fuel oils contain larger amounts. Peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The Bay Area Air Basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 8.1-5 presents the state air quality standard for SO_2 and the maximum levels recorded from 1994 through 2003 in San Francisco. The federal 1-hour average standard is 0.25 ppm; during the period shown, the average SO_2 levels measured at the Arkansas Street station have been approximately one-tenth of the federal standard. Figure 8.1-11 shows that for several years the maximum 1-hour SO_2 levels typically have been less than approximately one-fifth of the state standard.

TABLE 8.1-5
Sulfur Dioxide Levels in San Francisco, Arkansas Street Monitoring Station, 1994–2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 1-Hour Average	0.017	0.044	0.036	0.026	0.036	0.028	0.019	0.025	0.053	0.024
Highest 24-Hour Average	0.006	0.007	0.008	0.007	0.005	0.007	0.008	0.008	0.007	0.007
Annual Average	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.002	0.002
Number of Days Exceeding:										
State Standard (0.04 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.14 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005); USEPA AirData (USEPA, 2005).

8.1.3.5 Particulate Sulfates

Particulate sulfates are the product of further oxidation of SO_2. The BAAQMD is in attainment of the state standard for sulfates. There is no federal standard for sulfates.

Table 8.1-6 shows the California air quality standard for particulate sulfate and the maximum 24-hour average levels recorded at Arkansas Street from 1994 through 2003. The trend of maximum 24-hour average sulfates over this period is plotted in Figure 8.1-12. Monitored concentrations have been well below half the state standard during this period.

TABLE 8.1-6
PM_{10} Sulfate Levels in San Francisco, Arkansas Street Monitoring Station, 1994–2003 ($\mu g/m^3$)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 24-Hour Average	12.3	6.0	7.5	5.6	3.3	9.7	4.2	15.7	4.8	6.4
Number of Days Exceeding:										
State Standard (25 $\mu g/m^3$, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005); USEPA AirData (USEPA, 2005).

8.1.3.6 Particulate Matter (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In 1984, CARB adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect previously. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of particulates that can be inhaled into the lungs and therefore is a better measure to use in assessing potential health effects. In 1987, USEPA also replaced national TSP standards with PM_{10} standards. The San Francisco Bay Area Air Basin is in attainment of the federal PM_{10} standards but exceeds the state standards.

Table 8.1-7 shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Arkansas Street monitoring station during 1994–2003, and geometric and arithmetic annual averages for the same period. The maximum 24-hour PM_{10} levels exceed the state standard, and the federal standard has not been exceeded during the past 10 years. The annual average PM_{10} levels have remained below the federal standards throughout the 10-year period.

TABLE 8.1-7
PM_{10} Levels in San Francisco, Arkansas Street Monitoring Station, 1994–2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 24-Hour Average	93	50	71	81	52	78	63	67	74	51
Annual Arithmetic Mean (State Standard = 20 $\mu g/m^3$)[a]	24.7	22.1	21.4	22.4	20.2	22.6	21.6	22.8	21.0	22.7
(Federal Standard = 50 $\mu g/m^3$)	28.6	24.8	24.3	24.9	22.1	26.4	24.3	26.3	24.7	21.8
Number of Days Exceeding:										
State Standard (50 $\mu g/m^3$, 24-hour)	34	0	12	14	6	36	12	42	12	6
Federal Standard (150 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, California Air Resources Board (CARB, 2005); USEPA AirData (USEPA, 2005).
[a] State annual standard was recently changed from 30 $\mu g/m^3$ to 20 $\mu g/m^3$.

The trend of maximum 24-hour average PM_{10} levels is plotted in Figure 8.1-13, and the trend of expected violations of the state 24-hour standard of 50 $\mu g/m^3$ is plotted in Figure 8.1-14. Note that since PM_{10} is measured only once every six days, expected violation days are six times the number of measured violations. The trend of maximum annual average PM_{10} readings and the California and federal standards are shown in Figure 8.1-15. Annual average PM_{10} concentrations are well below the federal standard, but remain slightly above the new state standard of 20 $\mu g/m^3$.

8.1.3.7 Fine Particulate Matter ($PM_{2.5}$)

As discussed previously, the NAAQS for particulates were further revised by USEPA with new standards that went into effect on September 16, 1997; two new $PM_{2.5}$ standards were added at that time. In June 2002, CARB established a new annual standard for $PM_{2.5}$. $PM_{2.5}$ data have been collected at the Arkansas Street monitoring station since 1999, and are presented here.

Table 8.1-8 shows the state and federal air quality standards for $PM_{2.5}$, maximum levels recorded at the Arkansas Street monitoring station 1999–2003, and 3-year averages for the same period. The 24-hour average concentrations have exceeded the standard occasionally throughout the monitoring period; however, there are not enough data available to draw any conclusions regarding trends in the 3-year average of 98th percentile values. Annual average $PM_{2.5}$ levels have also occasionally exceeded the standard. The Bay Area Air Basin is considered a nonattainment area for the state $PM_{2.5}$ standard, but is unclassified in relation to the federal standard.

TABLE 8.1-8
$PM_{2.5}$ Levels in San Francisco, Arkansas Street Monitoring Station, 1994–2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest 24-Hour Average	–	–	–	–	–	71.2	47.9	76.6	70.2	41.6
Number of Days Exceeding:										
Federal Standard (65 μg/m³, 24-hour)	–	–	–	–	–	1	0	2	4	0
98th Percentile	–	–	–	–	–	47.4	35.3	51.3	57.5	33.0
3-yr Average, 98th Percentile	–	–	–	–	–	–	–	–	–	47
Annual Arithmetic Mean	–	–	–	–	–	12.6	11.4	11.5	13.1	10.1
3-yr Annual Average (Federal Std = 15μg/m³)	–	–	–	–	–	–	–	11.8	12.0	11.6

Source: California Air Quality Data, California Air Resources Board (CARB, 2005); USEPA AirData (USEPA, 2005).

The trend of the 98th percentile of the 24-hour average $PM_{2.5}$ levels is plotted in Figure 8.1-16.

8.1.3.8 Airborne Lead

The majority of lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasolines contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phaseout of leaded gasoline began. As a result, ambient lead levels decreased dramatically. The Bay Area Air Basin has been in attainment of state and federal airborne lead levels for air quality planning purposes for a number of years.

The ambient lead levels are also monitored at Arkansas Street. Table 8.1-9 lists the federal air quality standard for airborne lead and the levels reported in San Francisco between 1994 and 2003. Maximum quarterly levels are well below the federal standard. (CARB no longer reports summary lead statistics on its website.)

TABLE 8.1-9
Airborne Lead Levels at San Francisco, Arkansas Street Monitoring Station, 1994-2003 (ppm)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Highest Quarterly Average	0.02	0.03	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01
Number of Days Exceeding:										
Federal Standard (1.5 μg/m³, quarterly)	0	0	0	0	0	0	0	0	0	0

Source: USEPA AirData (USEPA, 2005).

8.1.4 Affected Environment

The USEPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of USEPA Region IX, which has its offices in San Francisco. Region IX is responsible for the local administration of USEPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. USEPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the State Implementation Plan (SIP). The SIP is required by the federal Clean Air Act (CAA) to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

CARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update as necessary the state's ambient air quality standards; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California Health & Safety Code [H&SC] §39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution control districts (APCDs) were required to be established in each county of the state (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. In addition, special air quality management districts (AQMDs), with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California, including the San Francisco Bay Area (H&SC §40200 et seq.).

APCDs and AQMDs in California have principal responsibility for:

- Developing plans for meeting the state and federal ambient air quality standard
- Developing control measures for nonvehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution
- Enforcing air pollution statutes and regulations governing nonvehicular sources
- Developing employer-based trip reduction programs

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this project. The other air agencies having permitting authority for this project are shown in Table 8.1-10. The applicable federal laws, ordinances, regulations and standards (LORS) and compliance with these requirements are discussed in more detail in the following sections. An application for a Determination of Compliance will be filed with the BAAQMD at approximately the same time as the Supplement to the AFC is filed with the California Energy Commission (CEC).

TABLE 8.1-10
Air Quality Agencies

Agency	Authority	Contact
USEPA Region IX	Oversight of permit issuance, enforcement	Gerardo Rios, Chief Permits Office USEPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1259
California Air Resources Board	Regulatory oversight	Mike Tollstrup, Chief Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
Bay Area Air Quality Management District	Permit issuance, enforcement	Brian Bateman, Director Engineering Division Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109 (415) 749-4653

8.1.4.1 Laws, Ordinances, Regulations, and Standards

8.1.4.1.1 Federal

Prevention of Significant Deterioration Program

Authority: CAA §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52.

Requirements: Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies with respect to attainment pollutants for which ambient concentrations are lower than the corresponding national ambient air quality standards (NAAQS). The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled using Best Available Control Technology (BACT).
- Air quality impacts in combination with other increment-consuming sources must not exceed maximum allowable incremental increases for SO_2, PM_{10}, and NO_x.
- Air quality impacts of all sources in the area plus ambient pollutant background levels cannot exceed NAAQS.
- Pre- and/or post-construction air quality monitoring may be required.
- The air quality impacts on soils, vegetation, and nearby PSD Class I areas (specific national parks and wilderness areas) must be evaluated. (Note: The SFERP is located in a Class II area.)

PSD review jurisdiction had been delegated to the BAAQMD for all pollutants; however, the delegation was rescinded in March 2003 and PSD permits for BAAQMD major sources are

now issued by USEPA Region IX. Since the proposed project is not subject to PSD review, the applicant will not need to seek a separate permit from USEPA.

Administering Agency: USEPA Region IX.

New Source Review

Authority: CAA §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52.

Requirement: Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. New source review applies with respect to nonattainment pollutants for which ambient concentration levels are higher than the corresponding NAAQS. The following federal requirements apply on a pollutant-by-pollutant basis, depending on facility emission rates.

- Emissions must be controlled to the lowest achievable emission rate (LAER).
- Sufficient offsetting emissions reductions must be obtained following the requirements in the regulations to continue reasonable further progress toward attainment of applicable NAAQS.
- The owner or operator of the new facility must demonstrate that major stationary sources owned or operated by the same entity in California are in compliance or on schedule for compliance with applicable emissions limitations in this rule.
- The administrator must find that the implementation plan has been adequately implemented.
- An analysis of alternatives must show that the benefits of the proposed source significantly outweigh any environmental and social costs.

New source review jurisdiction has been delegated to the BAAQMD for all pollutants and is discussed further under local LORS and conformance.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Acid Rain Program

Authority: CAA §401 (Title IV), 42 USC §7651

Requirement: Requires the reduction of the adverse effects of acid deposition through reductions in emissions of sulfur dioxide and nitrogen oxides. BAAQMD has received delegation authority to implement Title IV.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

Title V Operating Permits Program

Authority: CAA §501 (Title V), 42 USC §7661.

Requirements: Establishes comprehensive operating permit program for major stationary sources. BAAQMD has received delegation authority for this program.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Standards of Performance for New Stationary Sources

Authority: CAA §111, 42 USC §7411; 40 CFR Part 60.

Requirements: Establishes national standards of performance for new stationary sources. These standards are enforced at the local level with USEPA oversight. Relevant new stationary source performance standards are discussed under local LORS below.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

National Emission Standards for Hazardous Air Pollutants

Authority: CAA §112, 42 USC §7412.

Requirements: Establishes national emission standards for hazardous air pollutants. These standards are enforced at the local level with USEPA oversight and are further discussed under local LORS and conformance.

Administering Agency: BAAQMD, with USEPA Region IX oversight.

8.1.4.1.2 State

Nuisance Regulation

Authority: CA Health & Safety Code §41700.

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Administering Agency: BAAQMD and CARB.

Toxic "Hot Spots" Act

Authority: H& SC §44300-44384; 17 CCR §93300-93347.

Requirements: Requires preparation and biennial updating of inventory of facility emissions of hazardous substances listed by CARB, in accordance with CARB's regulatory guidelines. Risk assessments are to be prepared by facilities required to submit emissions inventories according to local priorities.

Administering Agency: BAAQMD and CARB.

CEC and CARB Memorandum of Understanding

Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k).

Requirements: Provides for the inclusion of requirements in the CEC's decision on an application for certification to assure protection of environmental quality; application is required to include information concerning air quality protection.

Administering Agency: California Energy Commission.

8.1.4.1.3 Local

BAAQMD Regulations and Policies

Authority: CA Health & Safety Code §40001.

Requirements: Prohibit emissions and other discharges (such as smoke and odors) from specific sources of air pollution in excess of specified levels.

Administering Agency: BAAQMD, with CARB oversight.

Environment Code/Department of Public Health

Authority: Environment Code Chapter 10, Department of Public Works, Order No. 171,379.

Requirements: Require implementation of dust reduction measures set forth in the Environmental Code and Order 171,378 during construction of the project.

Administering Agency: City Agencies awarding contracts and the San Francisco Department of Public Works.

San Francisco Board of Supervisors Ordinances

Authority: Board of Supervisors Ordinance 124-01.

Requirements: Adopts minimum requirements for protection of human health and the environment for new electric generation at the Potrero Power Plant; requires approval of the Board of Supervisors for any agreement by City officials or departments for or related to new electric generation in Southeast San Francisco.

Administering Agency: San Francisco Board of Supervisors.

8.1.4.2 Conformance of Facility

As addressed in this section, SFERP is designed, and will be constructed and operated, in accordance with all relevant federal, state, and local requirements and policies concerning protection of air quality.

8.1.4.2.1 Federal and Bay Area Air Quality Management District Prevention of Significant Deterioration Program. USEPA has promulgated PSD regulations for areas that are in compliance with national ambient air quality standards (40 CFR 52.21). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., specific national parks and wilderness areas). Although USEPA had delegated the authority to implement the PSD program to various California air pollution control districts, including the BAAQMD where SFERP is located (40 CFR 52.21[u]), that delegation was rescinded on March 3, 2003, and PSD permits for the Bay Area are now issued by USEPA Region IX. However, the BAAQMD regulations still require compliance with the BAAQMD's own PSD program.

The five principal areas of the federal PSD program are as follows:

- Applicability
- BACT
- Pre-construction monitoring

- Increments analysis
- Air quality impact analysis

The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing stationary source. (These terms are defined in federal regulations.) (40 CFR 52.21) The determination of applicability is based on evaluating the emissions changes associated with the proposed project in addition to all other emissions changes at the same location since the applicable PSD baseline dates (40 CFR 52.21).

Under the BAAQMD PSD program (Regulation 2, Rule 2), BACT must be applied when a new or modified major source shows emission increases in excess of 10 pounds per highest day of precursor organic compounds (POC), nonprecursor organic compounds (NPOC), NO_x, SO_2, PM_{10}, or CO. The BAAQMD program also dictates that a permit for a project will be denied if specified emissions thresholds are exceeded unless air dispersion modeling shows that ambient air quality standards will not be violated and the applicable PSD increments, as defined in the PSD rule, will not be exceeded. The PSD emission threshold levels for requiring modeling are shown in Table 8.1-11.

TABLE 8.1-11
BAAQMD Emission Threshold Levels for Modeling

Pollutant	Major Source Threshold
PM_{10}	100 tpy
NO_x	100 tpy
SO_2	100 tpy
VOC	100 tpy
CO	100 tpy

tpy = tons per year

The PSD program applies, on a pollutant-specific basis, only to a new major stationary source or to a major modification of an existing major stationary source that meets the following criteria:

- A new facility that will emit 100 tons per year (tpy) or more, and is one of the 28 PSD source categories in the federal CAA or any new facility that will emit 250 tpy or more; or
- A facility that emits 100 tpy or more with net emissions increases since the applicable PSD baseline date that exceed the significant emissions threshold levels.

Since the emissions from the SFERP will be less than 100 tpy, the PSD program requirements do not apply.

8.1.4.2.2 Federal New Source Performance Standards. The Standards of Performance for New Stationary Sources are source-specific federal regulations, limiting the allowable emissions of criteria pollutants (i.e., those that have a national ambient air quality standard). These

regulations apply to certain sources depending on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. Recordkeeping, reporting, and monitoring requirements are usually necessary for the regulated pollutants from each subject source; the reports must be regularly submitted to the reviewing agency (40 CFR 60.4). This program has been delegated by USEPA to the BAAQMD.

Subpart GG (Standards of Performance for Stationary Gas Turbines) applies to combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (Gj/hr) (10.15 MMBtu/hr) at higher heating value. The SFERP combustion turbines have an hourly heat input that exceeds this threshold. The NSPS NO_x emission limit is defined by the following equation:

$$STD = \frac{0.0075 * 14.4}{Y} + F$$

Where:

STD = allowable NO_x emissions (percent volume at 15 percent O_2 on a dry basis)

Y = manufacturer's rated heat rate at peak load (kilojoules per watt hour)

F = NO_x emission allowance for fuel-bound nitrogen (assumed to be zero for natural gas)

The value of Y for the LM6000PC SPRINT CTGs is 8916 kJ/kWh LHV, or 9888 kJ/kWh HHV. This corresponds to a NSPS limit of 109 ppm.

USEPA recently issued a Notice of Proposed Rulemaking for a new Subpart KKKK that would apply to gas turbines with a heat input in excess of 1 MMBtu/hr that commence construction after February 18, 2005. Gas turbines subject to this rule would be exempt from Subpart GG. If the rule is ultimately adopted, it would be applicable to the proposed SFERP CTGs and Subpart GG would not apply.

Subpart KKKK limits NO_x and SO_2 emissions from the new gas turbines based on power output. The limits for turbines greater than 30 MW are 0.39 lb NO_x per MW-hr and 0.58 lb SO_2 per MW-hr. The proposed emissions limits of 2.5 ppmc NO_x and 0.402 ppmc SO_2 are equivalent to 0.09 lb NO_x /MW-hr and 0.009 lb SO_2 per MW-hr and are well below the proposed Subpart KKKK limits,

8.1.4.2.3 National Emissions Standards for Hazardous Air Pollutants. The National Emissions Standards for Hazardous Air Pollutants (NESHAPs) are either source-specific or pollutant specific regulations, limiting the allowable emissions of hazardous air pollutants from the affected sources (40 CFR 61). Unlike criteria air pollutants, hazardous air pollutants do not have a national ambient air quality standard but have been identified by USEPA as causing or contributing to the adverse health effects of air pollution.

Administration of the hazardous air pollutants program has been delegated to the BAAQMD and is described in Section 8.1.4.2.10 (40 CFR 61.04).

8.1.4.2.4 Federal Clean Air Act Amendments of 1990. In November 1990, substantial revisions and updates to the federal CAA were signed into law. This complex enactment addresses a

number of areas that could be relevant to the proposed SFERP, such as SIP requirements for nonattainment areas that set new compliance deadlines and annual progress increments, more extensive permitting requirements, new USEPA mandates and deadlines for developing rules to control air toxic emissions, and acid deposition control. Following is a summary of the new provisions applicable to this project.

Title IV—Acid Deposition Control. This title requires the reduction of emissions of acidic compounds and their precursors (42 USC §7651 et seq.). The principal source of these compounds is the combustion of fossil fuels. Other requirements include monitoring and recordkeeping for emissions of SO_2 and NO_x and for opacity and volumetric flow.

Title V—Operating Permits. This title establishes a comprehensive operating permit program for major stationary sources (42 USC §7661 et seq.). Under the Title V program, a single permit is required that includes a listing of all the stationary sources, applicable regulations, requirements, and compliance determination.

The BAAQMD's Major Facility Review Program (Regulation 2, Rule 6) has been approved by USEPA and includes the acid rain program. Consequently, the BAAQMD has received delegation to implement the Title IV and V programs. The BAAQMD Title IV and V permit programs applicable to this project are summarized.

8.1.4.2.5 California Clean Air Act. AB 2595, the California CAA (Act), was enacted by the California Legislature and became law in January 1989. The Act requires the local air pollution control districts to attain and maintain both the federal and state ambient air quality standards at the "earliest practicable date." The Act contains several milestones for local districts and the CARB. In 1993, the BAAQMD submitted to the Air Resources Board an air quality plan defining the program for meeting the required emission reduction milestones in the Bay Area. Several updates to the original plan have also been submitted.

Air quality plans must demonstrate attainment of the state ambient air quality standards and must result in a five percent annual reduction in emissions of nonattainment pollutants (ozone, CO, NO_x, SO_2, and their precursors) in a given district (H&SC §40914). A local district may adopt additional stationary source control measures or transportation control measures, revise existing source-specific or new source review rules, or expand its vehicle inspection and maintenance program (H&SC §40918) as part of the plan. BAAQMD air quality plans specify the development and adoption of more stringent regulations to achieve the requirements of the Act. The applicable regulations that will apply to SFERP are included in the discussion of BAAQMD prohibitory rules in Section 8.1.4.2.8.

8.1.4.2.6 BAAQMD New Source Review Requirements. BAAQMD Regulation 2, Rule 2, New Source Review, requires that a pre-construction review be conducted for all proposed new or modified sources of air pollution. New Source Review contains three principal elements:

- BACT
- Emissions offsets
- Air quality impact analysis

BACT is required for any source that has an increase in emissions of any criteria pollutant and that has a potential to emit in excess of 10 pounds per highest day. The district rule also

contains separate BACT thresholds for nine "non-criteria" pollutants, such as lead and various sulfur compounds.

The BAAQMD regulation further requires that for new or modified sources emitting in excess of 35 tons per year of POCs or NO_x, the total project emissions must be offset (i.e., an emission reduction comparable to the emission increase attributable to the source must be achieved at the project site or at another location). To ensure that there is no net increase in regional emissions as a result of new or modified sources, offsets at a ratio of 1.15 to 1.0 must be provided. For facilities emitting more than 10 but less than 35 tons per year of POCs or NO_x, offsets are provided by the BAAQMD from the Small Facility Banking account at a ratio of 1.0 to 1.0 unless ERCs are owned by the developer.

In addition, a Major Facility (100 tpy facility) is required to offset net emissions increases from a project, on a pollutant-specific basis, in excess of 1 tpy of PM_{10} and SO_2 that have occurred or will occur after April 5, 1991.

For the BAAQMD, an air quality impact analysis is required to demonstrate that the project must not cause a violation or interfere with the maintenance of any ambient air quality standards or applicable increments.

Finally, the district may impose appropriate monitoring requirements to ensure compliance. BAAQMD Regulation 2, Rule 3 specifies procedures for review and standards for approval of Authorities to Construct power plants within the BAAQMD. The applicant must obtain a Determination of Compliance and an Authority to Construct from the BAAQMD prior to commencing construction. An application for a Determination of Compliance and an Authority to Construct is expected to be filed with the BAAQMD within one week of the filing of the AFC with the CEC.

8.1.4.2.7 Risk Management Policy. The BAAQMD has developed a procedure for reviewing permit applications for projects that will emit compounds that may result in health impacts. The procedure requires comparing the potential emissions of toxic air contaminants from the project to specific levels, and requires the preparation of a written risk screening analysis if the levels are exceeded. The screening analysis includes estimates of the maximum annual concentrations of the toxic air contaminants, calculations of cancer risk, and comparison of maximum modeled concentrations with appropriate non-cancer threshold levels. The use of best available control technology for toxic air contaminant emissions is required if the incremental cancer risk from the project is projected to be between 1 and 10 in 1 million.

8.1.4.2.8 Other BAAQMD Regulatory Requirements. As required by the federal CAA and the California CAA, plans that demonstrate attainment must be developed for those areas that have not attained the national and state air quality standards (42 USC §7401; H&SC §40912). As part of its plan, the BAAQMD has developed regulations limiting emissions from specific sources. These regulations are collectively known as "prohibitory rules," because they prohibit the construction or operation of a source of pollution that would violate specific emission limits.

The general prohibitory rules of the BAAQMD applicable to the SFERP are as follows.

Regulation 1-301—Public Nuisance. Prohibits emissions in quantities that adversely affect public health, other businesses, or property.

Regulation 6—Particulate Matter and Visible Emissions. Limits the visible emissions from the project to no darker than No. 1 when compared to a Ringelmann Chart for a period or periods aggregating more than 3 minutes in any hour. Opacity is limited to no greater than 20 percent from any source for a period or periods aggregating 3 minutes in any hour. Particulate emission concentrations cannot exceed 0.15 grains per dry standard cubic foot of exhaust gas volume.

Regulation 7—Odorous Substances. Limits emission concentrations of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine. This regulation becomes applicable upon confirmation of 10 or more odor complaints from the public within a 90-day period. Once the rule becomes applicable, it remains in effect for one year and can be re-triggered with the receipt of five or more odor complaints within a 90-day period.

Regulation 9, Rule 1—Sulfur Dioxide. Limits stationary source emissions of sulfur dioxide to less than 300 ppm. In addition, the rule restricts sulfur dioxide emissions that will result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2—Hydrogen Sulfide. Limits the emission of hydrogen sulfide during any 24-hour period in such quantities that result in ground-level hydrogen sulfide concentrations in excess of 0.06 ppm averaged over 3 consecutive minutes or 0.03 ppm averaged over any 60 consecutive minutes.

Regulation 9, Rule 3—Nitrogen Oxides from Heat Transfer Operations. Limits emissions of nitrogen oxides from new or modified heat transfer operations to less than 125 ppm.

Regulation 9, Rule 9—Nitrogen Oxides from Stationary Gas Turbines. Limits emissions of nitrogen oxides from combustion turbines during baseload operations to less than 9 ppmv corrected to 15 percent oxygen.

Regulation 11, Rule 10—Hexavalent Chromium Emissions from Cooling Towers. Limits hexavalent chromium emissions from cooling towers by eliminating the use of chromium-based chemicals.

8.1.4.2.9 BAAQMD New Source Performance Standards. Regulation 10 (40 CFR 60 Subpart GG)—Standards of Performance for Stationary Gas Turbines. The BAAQMD has adopted by reference the federal New Source Performance Standard (NSPS) for stationary gas turbines. This regulation requires monitoring of sulfur and nitrogen in the fuel; limits emissions of NO_x and SO_2 emissions; requires source testing of emissions; requires emissions monitoring; and requires recordkeeping for the collected data.

8.1.4.2.10 BAAQMD Hazardous Air Pollutants. USEPA recently established a National Emissions Standards for Hazardous Air Pollutants (NESHAP) standard for formaldehyde from stationary gas turbines. This regulation applies to new and reconstructed gas turbines. Because the HAP emissions for the project are below the major source thresholds of 10 tpy for a single HAP and 25 tpy for any combination of HAPs, the project is exempt from the NESHAP for combustion turbines. Consequently, this regulation does not apply to the project and will not be addressed further. Please note that while Section 8.1.5.2.4 shows ammonia emissions greater than 25 tpy for the project, ammonia is not an HAP as defined by Section 112 of the CAA.

8.1.4.2.11 BAAQMD Title IV and Title V Programs

BAAQMD Regulation 2, Rule 6—Major Facility Review. This rule implements the operating permit requirements of Title V of the federal CAA. The rule applies to major facilities, Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by USEPA as requiring a Title V permit. As a Phase II acid rain facility, the SFERP will be required to submit a permit application to undergo a major facility review within 12 months of commencement of facility operation.

The BAAQMD has adopted by reference the federal Title IV (Acid Rain) Regulation and is now responsible for implementing the program through the Title V operating permit program. Under Title IV, a project must comply with maximum operating emissions levels for SO_2 and NO_x and is required to install and operate continuous monitoring systems for SO_2, NO_x, and CO_2 emissions. Extensive recordkeeping and reporting requirements are also part of the acid rain program.

8.1.4.2.12 San Francisco Board of Supervisors Ordinance No. 124-01 and Resolutions No. 827-02 and 458-03. In May 2001 the San Francisco Board of Supervisors adopted Ordinance No. 124-01, which sets forth minimum requirements for the protection of human health and the environment for any proposed new electric generation at the Potrero Power Plant and requires approval by the Board of Supervisors for any agreement by City officials or departments for or related to new electrical generation in San Francisco. The Ordinance calls for the Board to work with the SFPUC and the Department of the Environment (ENV) to adopt a new electricity resource plan for San Francisco. The Board has also adopted Resolution No. 827-02, which adopted the Electricity Resource Plan prepared by the SFPUC and ENV as policy guidelines, and Resolution No. 458-03, which opposes the Potrero Unit 7 power plant project.

All applicable LORS are summarized in Table 8.1-12.

8.1.5 Environmental Impacts

8.1.5.1 Overview of the Analytical Approach to Estimating Facility Impacts

The new emissions sources at the SFERP include three simple-cycle LM6000PC Sprint combustion turbines and a small two-cell cooling tower. The cooling tower will be used to provide plant auxiliary cooling water and to chill turbine inlet air, which increases power output under certain ambient conditions. Each turbine will be equipped with water injection and a selective catalytic reduction (SCR) system for NO_x control, and an oxidation catalyst for control of CO. Emissions control systems will be fully operational during all operations except startups and shutdowns. Maximum annual emissions are based on operation of the SFERP equipment at maximum firing rates for up to 12,000 engine hours per year, total for the three CTGs. (Annual facility operation will be limited to the equivalent of 12,000 full-load hours per year through an annual heat input limit.)

Ambient air quality impact analyses for the facility have been conducted to satisfy the CEC requirements for impacts from criteria pollutants (NO_2, CO, PM_{10}, and SO_2) and noncriteria pollutants during project construction and operation. The following sections describe the emission sources that have been evaluated, the results of the ambient impact analyses, and the

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
CAA §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC 7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 (40 CFR 51 & 52) (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	BAAQMD with USEPA oversight	After project review, issues Authority to Construct (ATC) with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1 (p. 47), 8.1.4.2.1 (p.13), Appendix 8.1E
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.1 (p. 47), 8.1.4.2.1 (p.13), Appendices 8.1-5, 8.1-6
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	Requires reductions in NO_x and SO_2 emissions.	BAAQMD with USEPA oversight	Issues Acid Rain permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.2.4 (p.15)
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	Establishes comprehensive permit program for major stationary sources.	BAAQMD with USEPA oversight	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.4.2.4 (p.15)
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards [NSPS])	Establishes national standards of performance for new stationary sources.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6 (p. 47), 8.1.4.2.2 (p. 14)
CAA §112, 42 USC §7412, 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants [NESHAPs])	Establishes national emission standards for hazardous air pollutants.	BAAQMD with USEPA oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6 (p. 47), 8.1.4.2.3 (p. 15)
State					
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Outlaws discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1.2 (p. 12)

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
H&SC §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Screening HRA submitted before start of construction.	8.1.5.4 (p.43), 8.1.4.1.2 (p.12), Appendix 8.1C
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	Requires that CEC's decision on AFC include requirements to assure protection of environmental quality; AFC required to address air quality protection.	CEC	After project review, issues Final Determination of Compliance (FDOC) with conditions limiting emissions.	CEC approval of AFC, i.e., FDOC, to be obtained before start of construction.	8.1.4.1.2 (p. 13)
Local					
BAAQMD Regulation 1 §301 (Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p.52), 8.1.4.2.8 (p.17)
BAAQMD Regulation 2 (Permits), Rule 2 (New Source Review)	NSR and PSD: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.5.1, 8.1.5.2, 8.1.5.3, 8.1.5.4 (pp. 23-43), 8.1.6.3 (p.47), 8.1.4.2.6 (p. 16), Appendices 8.1-2, 8.1-5, 8.1-6
BAAQMD Regulation 2, Rule 6 (Major Facility Review)	Implements operating permits requirements of CAA Title V and acid rain regulations of CAA Title IV.	BAAQMD	Issues Title V permit after review of application.	Application to be made within 12 months of start of facility operation.	8.1.6.1 (p. 52), 8.1.4.2.4 (p. 15), 8.1.4.2.11 (p. 19)
BAAQMD Regulation 6 (Particulate Matter and Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour; limits PM emissions to 0.15 gr/dscf.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 52), 8.1.4.2.8 (p. 17)
BAAQMD Regulation 7 (Odorous Substances)	Limits emissions of dimethylsulfide, ammonia, mercaptan, phenols, and trimethylamine; becomes applicable upon confirmation of 10 or more odor complaints with 90 days.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 17)
BAAQMD Regulation 9, Rule 1 (Sulfur Dioxide)	Limits SO2 emissions to <300 ppm; also limits SO2 emissions resulting in ground level concentrations of specified level and duration.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)

TABLE 8.1-12
Laws, Ordinances, Regulations, Standards (LORS), and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
BAAQMD Regulation 9, Rule 2 (Hydrogen Sulfide)	Limits H_2S emissions during any 24-hour period that result in ground level H_2S concentrations exceeding specified levels and durations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 9, Rule 3 (Heat Transfer Operation NO_x Emissions Limits)	Limits NO_x emissions from new heat transfer operations 250 MMBtu/hr maximum to <125 ppm.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 9, Rule 9 (Nitrogen Oxides from Stationary Gas Turbines)	Limits NO_x emissions during baseload operations to 9 ppmv @ 15 percent exhaust oxygen (15 ppmv if SCR is not used).	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 18)
BAAQMD Regulation 10 (40 CFR 60 Subpart GG) (Standards of Performance for Stationary Gas Turbines)	Requires monitoring of fuel, other operating parameters; limits NO_x and SO_2 emissions, requires source testing, emissions monitoring, and recordkeeping.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.6.3 (p. 53), 8.1.4.2.8 (p. 19)
BAAQMD Regulation 11, (Hazardous Pollutants)	Implements federal NESHAP regulations.	BAAQMD with CARB oversight	After project review, issues ATC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	8.1.4.1.1 (p. 12), 8.1.4.2.3 (p. 19)
San Francisco Board of Supervisors Ordinance No. 124-01	Requires Board of Supervisors approval for any agreement by City officials or departments for or related to new electric generation in Southeast San Francisco.	SF Board of Supervisors	After project review, votes to approve or disapprove financing and key contracts for the project.	Board of Supervisors approval of financing and key contracts for the project to be obtained before start of construction.	8.1.6.4 (p. 56)

evaluation of facility compliance with the applicable air quality regulations, including BAAQMD Regulation 2 (Permits). Regulation 2, Rule 2 includes the BAAQMD's NSR requirements.

8.1.5.1.1 New Equipment. The proposed combustion turbines are General Electric LM6000PC Sprint combustion turbines driving nominal 48 MW turbine generators. The combustion turbines will be fueled exclusively with natural gas. The combustion turbines will be equipped with water injection to control NOx emissions and inlet air chillers to maintain turbine output across the full range of ambient temperatures. Post-combustion air pollution controls will include SCR for NOx control and oxidation catalysts for carbon monoxide (CO) control. Any or all of the combustion turbines may be operated up to 24 hours per day, 7 days per week, with total plantwide heat input not to exceed the equivalent of 12,000 full-load engine hours per year. (Annual facility operation will be limited to the equivalent of 12,000 full-load hours per year through an annual heat input limit.) Specifications for the new combustion turbines are summarized in Table 8.1-13. A typical fuel analysis is summarized in Table 8.1-14.

TABLE 8.1-13
New LM6000PC Combustion Turbine Design Specifications

Manufacturer	General Electric
Model	LM6000PC
Fuel	Natural gas
Design Ambient Temperature*	36°F
Nominal Heat Input Rate:	487.3 MMBtu/hr @ HHV
Nominal Power Generation Rate:	48 MW
Nominal Exhaust Temperature:	826°F
Exhaust Flow Rate:	620,308 acfm
Exhaust O_2 Concentration, dry volume:	14.5%
Exhaust CO_2 Concentration, dry volume:	3.7%
Exhaust Moisture Content, wet volume:	11.2%
Emission Controls:	Water Injection and SCR (2.5 ppmv NO_x @ 15% O_2)
	Oxidation Catalyst (4 ppmv CO @ 15% O_2)

Note:
* Low-temperature scenario.

Engineering specifications for the turbines are contained in Appendix 8.1A, Table 8.1A-1.

The small two-cell cooling tower will be constructed adjacent to the turbines. The cooling tower will serve the condenser circuit heat rejection of the mechanical chillers used to chill the air entering the turbines. Specifications for the cooling tower are shown in Table 8.1-15.

TABLE 8.1-14
Nominal Fuel Properties—Natural Gas

Component Analysis		Chemical Analysis	
Component	**Average Concentration, Percent by Volume**	**Constituent**	**Percent by Weight**
CH_4	95.80	C	72.85
C_2H_6	1.94	H	23.91
C_3H_8	0.30	N	1.75
C_4H_{10}	0.09	O	1.50
C_5H_{12}	0.02	S	<1 gr/100 scf
N_2	1.05	Higher Heating Value	1,017 Btu/scf 22,895 Btu/lb
CO_2	0.79		
S	<0.00		

TABLE 8.1-15
Cooling Tower Specifications

Parameter	Value
Water Flow Rate, 10E6 lbm/hr	1.96
Water Flow Rate, gal/min	3,912
Drift Rate, Percent	0.001
Exhaust Flow Rate, ft^3/min (per cell, 2 cells)	214,950

8.1.5.1.2 Facility Operations

New LM6000PC Simple Cycle Combustion Turbines. General Electric provided combustion turbine performance specifications for three temperature scenarios—high temperature (80°F), ISO temperature (59°F), and low temperature (36°F). The ISO-temperature scenario with inlet air chilling was used to characterize maximum emissions because it has the highest hourly heat input and emission rates. Maximum daily operations are based on full-load operation of three combustion turbine generators (CTGs) for 24 hours. Maximum annual emissions are based on full-load operation for the equivalent of 12,000 full-load engine hours per year. Heat input limits, as summarized in Table 8.1-16, were established to provide the basis for the calculation of project and facility emissions.

TABLE 8.1-16
LM6000PC Combustion Turbine Operations

Interval	Heat Input, MMBtu (HHV)	
	Each CTG	Total, Three CTGs
Hourly	487.3	1,462
Daily	11,700	35,100
Annual	4,268,750	5,847,600

New Cooling Tower. The cooling tower will operate when inlet air chilling is necessary to maintain turbine output. For this application, the cooling tower is assumed to operate 24 hours per day, 8,760 hours per year.

8.1.5.2 Emissions Assessment: Criteria Pollutants

Criteria pollutants emitted from the combustion turbines include NO_x, sulfur oxides (SO_X), CO, POCs and fine particulate matter (PM_{10}). (All of the particulate matter emitted from the CTGs and the cooling tower is assumed to be less than 2.5 microns in diameter. All references to PM_{10} include $PM_{2.5}$ as well.) The cooling tower will emit only small quantities of PM_{10}. This section of the application presents calculated emissions from the new equipment.

The combustion turbines and cooling tower also will emit trace levels of toxic air contaminants (TACs), including ammonia. This section also presents the maximum TAC emissions from the proposed combustion turbines. Tables containing the detailed TAC emission calculations are included in Appendix 8.1A.

8.1.5.2.1 Criteria Pollutant Emissions: Combustion Turbines. Proposed maximum emissions from the LM6000PC combustion turbines were estimated on an hourly, daily, and annual basis based on expected peaking operation and proposed annual operating limitations.

Emissions During Normal Operations. Emissions of NO_x, CO, and POC were calculated from emission limits (in ppmv @ 15-percent O_2) and the exhaust flow rates. The NO_x emission limit reflects the application of SCR. The POC emission limit reflects the use of good combustion practices. The CO emission limit reflects the expected performance of the oxidation catalyst. Maximum emissions were based on the exhaust rate (222,850 dscfm) associated with the heat input rates shown in Table 8.1-16.

SO_X emissions were calculated from the heat input (in MMBtu) and a SO_X emission factor (in lb/MMBtu). The SO_X emission factor of 0.00092 lb/MMBtu was derived from the expected annual average fuel sulfur content of 0.33 grains per 100 standard cubic feet. Maximum SO_X emissions were calculated using the heat input rates in Table 8.1-16.

Maximum hourly PM_{10} emissions were obtained from manufacturer's guarantees for LM6000PC combustion turbines in previous applications and are based on results of recent source tests of similar turbines. $PM_{2.5}$ emissions were determined based on the assumption that all particulate matter emissions are less than 2.5 microns in size.

Maximum emission rates for the LM6000PC combustion turbines are summarized in Table 8.1-17. The BACT analysis upon which the emission factors are based is presented in Appendix 8.1E and summarized in Section 8.1.6.3.

TABLE 8.1-17
Maximum Emission Rates—Each CTG

Pollutant	ppmv @ 15% O_2	lb/MMBtu	lb/hr
NO_x	2.5[a]	0.009	4.41
SO_2[b]	0.15	0.00092	0.45
CO	4.0[a]	0.0088	4.30
POC	2.0[a]	0.0025	1.23
PM_{10}	n/a	n/a	3.0

Notes:

[a] NO_x, CO and POC emission rates exclude startups and shutdowns (see Table 8.1-18).

[b] Based on annual average natural gas sulfur content of 0.33 gr/100 scf.

Emissions During Startup and Shutdown. Maximum emission rates expected to occur during a startup or shutdown are shown in Table 8.1-18. PM_{10} and SO_2 emissions are not included in this table because emissions of these pollutants will be lower during startup and shutdown than during baseload facility operation.

TABLE 8.1-18
CTG Startup and Shutdown Emission Rates

	NO_x	CO	POC
Startup and Shutdown, lb/hr	40	10	2

8.1.5.2.2 Criteria Pollutants: Cooling Tower. Maximum emissions from the cooling tower are calculated from the average water flow rate, maximum drift rate, and maximum TDS of the make-up water. This calculation is shown in Appendix 8.1A, Table 8.1A-2a. Because the on-site water treatment facility has not yet been constructed, no recycled water is yet available for analysis. However, the applicant has performed an engineering analysis that indicates that the recycled water will have a maximum TDS content of 400 µg/L. The maximum TDS in the cooling tower circulating water was determined by assuming 5 cycles of concentration. The engineering analysis shown in Appendix 8.1A, Table 8.1A-2b shows the expected TDS content for the recycled water. SFERP will keep the TDS of the cooling tower circulating water at or below 2000 µg/L by either controlling the TDS of the recycled water or by reducing the cycles of concentration as necessary.

Although the cooling tower will operate only under high-temperature ambient conditions, emissions are calculated on a 24-hour per day, 8,760-hour per year basis. The two-cell cooling tower will emit a maximum of 0.04 pounds per day and 0.2 tons per year of PM_{10}.

As emissions from the tower are less than 10 pounds per day and 5 tons per year, the cooling tower is exempt from permitting and is not subject to BACT or offset requirements.

A description of the onsite water treatment process is provided in Section 2.2.7.3 of the AFC. The only potential air contaminants from the water treatment process would be odorous compounds. As described in Section 2.2.7.3 of the AFC, equipment open to the atmosphere will be vented through an activated carbon collection system to control odors.

8.1.5.2.3 Criteria Pollutant Emissions Summary. Maximum facility emissions are shown in Table 8.1-19. The emission calculations are based on the CTG emission rates shown in Tables 8.1-17 and 8.1-18, the fuel use limitations in Table 8.1-16, and the following assumptions:

- Each CTG may operate up to 24 hours per day.
- Each CTG may have up to two 2-hour startups per day, with a total of 4 hours of startup/shutdown activity for each CTG.
- Under typical operating conditions, only one CTG would start up at a time; however, under certain conditions, all 3 CTGs could start up simultaneously.
- Each CTG may have a total of 250 hours per year of startup/shutdown activity.
- Total annual fuel use by all 3 CTGs will be limited to the equivalent of 12,000 hours per year for the facility.

TABLE 8.1-19
Maximum Emissions from New Equipment

Emissions/Equipment	NO_x	SO_2	CO	POC	PM_{10}
Maximum Hourly Emissions					
CTGs	120.0	1.3	30.0	6.0	9.0
Cooling Towers	–	–	–	–	<0.1
Total, pounds per hour	**120.0**	**1.3**	**30.0**	**6.0**	**9.0**
Maximum Daily Emissions					
CTGs	744.6	32.3	378.0	97.8	216.0
Cooling Towers	–	–	–	–	0.9
Total, pounds per day	**744.6**	**32.3**	**378.0**	**97.8**	**216.9**
Maximum Annual Emissions, tpy					
CTGs	39.8	2.7	27.9	7.7	18.0
Cooling Towers	–	–	–	–	0.2
Total, tons per year	**39.8**	**2.7**	**27.9**	**7.7**	**18.2**

8.1.5.3 Emissions Assessment: Toxic Air Contaminants

8.1.5.3.1 Toxic Air Contaminant Emissions: Combustion Turbines. Maximum hourly and annual TAC emissions were estimated for the proposed LM6000PC combustion turbines. Maximum proposed TAC emissions were calculated from the heat input rate (in MMBtu/hr and MMBtu/yr), emission factors (in lb/mmcf), and the nominal higher heating value of 1,017 Btu/scf. Hourly and annual emissions were based on the heat input rates shown in Table 8.1-16. The ammonia emission factor was derived from an ammonia slip limit of 10 ppmv @ 15-percent O_2. Other emission factors were obtained from AP-42 (Table 3.1-3, 4/00, and Table 3.4-1 of the Background Document for Section 3.1) and from the California Air Resources Board's CATEF database for combustion turbines. TAC emissions are summarized in Table 8.1-20.

TABLE 8.1-20
Maximum Proposed TAC Emissions: Combustion Turbines

Compound	Emission Factor (lb/mmcf)[a]	Maximum Proposed Emissions, 3 CTGs	
		(lb/hr)	(lb/year)
Ammonia[b]	10 ppm	19.6	78,480
Propylene	0.771	1.1	4,433
Hazardous Air Pollutants			
Acetaldehyde	0.0408	0.06	235
Acrolein	0.00369	$5.3x10^{-3}$	21
Benzene	0.00333	$4.8x10^{-3}$	19
1,3-Butadiene	0.000439	$6.3x10^{-4}$	2.5
Ethylbenzene	0.0326	0.05	187
Formaldehyde	0.367	0.53	2,110
Hexane	0.259	0.37	1,489
Naphthalene	0.00166	$2.4x10^{-3}$	9.5
PAHs[c]	0.00017	$2.6x10^{-4}$	1.0
Propylene Oxide	0.0296	0.04	170
Toluene	0.133	0.19	765
Xylene	0.0653	0.09	376
TOTAL HAPs		**1.4**	**5,385**

Notes:

[a] Obtained from AP-42 and the CATEF database for natural gas-fired combustion turbines. See text.

[b] Based on an exhaust NH_3 limit of 10 ppmv @ 15% O_2.

[c] Carcinogenic PAHs only; naphthalene considered separately.

8.1.5.3.2 Toxic Air Contaminant Emissions: Cooling Tower. TAC emissions from the cooling tower were calculated from the maximum drift (see Appendix 8.1A, Table 8.1A-2) of approximately 20 pounds of water per hour and an analysis of cooling tower blowdown.

These calculations are shown in Appendix 8.1A, Table 8.1A-5. This table includes a comparison of the maximum cooling tower TAC emission rates with the BAAQMD TAC trigger levels, and shows that TACs from the cooling tower will be well below the trigger levels. Therefore, the TAC emissions from the cooling tower are considered to be negligible and are not evaluated further.

8.1.5.4 Air Quality Impact Analysis

BAAQMD Rule 2-2-414 requires the applicant to provide ambient air quality modeling analyses and other impact assessments. This rule is applicable only if the proposed project is subject to PSD review, if it is a major facility with emissions of certain noncriteria pollutants in excess of the amounts listed in Rule 2-2-306, or if it is a facility with a net emissions increase greater than zero that proposes construction within 10 miles of a Class I area. Table 8.1-19 shows that emissions of all pollutants from the new facility will be less than 100 tons per year, so the facility is not a major source or subject to PSD. (Simple cycle combustion turbines are not one of the 28 PSD source categories listed in Section 169(1) of the CAA, so the facility would not be subject to PSD unless its emissions equal or exceed 250 tpy.) Further, the proposed facility will not be located within 10 miles of a Class I area. (The nearest Class I area, Point Reyes Wilderness Area, is over 20 miles from the project site.) Therefore, the modeling requirements of Regulation 2, Rule 2 are not applicable to the proposed project. However, the CEC requires various ambient air quality impact analyses for CEQA review, and those analyses are presented in this section.

8.1.5.4.1 Air Quality Modeling Methodology. An assessment of impacts from the SFERP combustion turbines on ambient air quality has been conducted using USEPA-approved air quality dispersion models. These models are based on various mathematical descriptions of atmospheric diffusion and dispersion processes in which a pollutant source impact can be calculated over a given area.

Figure 8.1B-1 in Appendix 8.1B shows the building layout used in the modeling analysis. Although the anticipated new construction on the adjacent MUNI Operations and Maintenance Facility has not yet begun, the buildings to be installed on the site are reasonably foreseeable and therefore are included in the layout to ensure that any downwash impacts are considered. The impact analysis was used to determine the worst-case ground-level impacts of the new turbines. The results were compared with established state and federal ambient air quality standards and PSD significance levels. If the standards are not exceeded then it is assumed that, in the operation of the facility, no exceedances are expected under any conditions. In accordance with the air quality impact analysis guidelines developed by USEPA (40 CFR Part 51, Appendix W: Guideline on Air Quality Models) and CARB (Reference Document for California Statewide Modeling Guideline, April 1989), the ground-level impact analysis includes the following assessments:

- Impacts in simple, intermediate, and complex terrain
- Aerodynamic effects (downwash) due to nearby building(s) and structures
- Impacts from inversion breakup (fumigation)
- Impacts from shoreline fumigation conditions

Simple, intermediate, and complex terrain impacts were assessed for all meteorological conditions that would limit the amount of final plume rise. Plume impaction on elevated

terrain, such as on the slope of a nearby hill, can cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level pollutant concentrations is caused by building downwash. Building downwash can occur when wind speeds are high and a building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the lee side (downwind) of the building or structure.

Fumigation conditions occur when the plume is emitted into a low-lying layer of stable air (inversion) that then becomes unstable, resulting in a rapid mixing of pollutants toward the ground. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground-level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in the summer. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume. Concentrations at any location downwind of a point source such as a stack can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

Where:

C = the concentration in the air of the substance or pollutant in question

Q = the pollutant emission rate

$\sigma y \sigma z$ = the horizontal and vertical dispersion coefficients, respectively, at downwind distance x

u = the wind speed at the height of the plume center

x,y,z = the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack

H = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

Gaussian dispersion models are approved by USEPA for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical

reactions, etc.). The USEPA models were used to determine if ambient air quality standards would be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Screening modeling procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring
- Results of the ambient air quality modeling analyses
- PSD increment consumption

The screening and refined air quality impact analyses were performed using the Industrial Source Complex, Short-Term Model ISCST3 (Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume source types; downwash effects; and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year).

Inputs required by the ISCST3 model include the following:

- Model options
- Meteorological data
- Source data
- Receptor data

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model supplies recommended default options for the user. Except where explicitly stated, such as for building downwash, as described in more detail below, default values were used. A number of these default values are required for USEPA and BAAQMD approval of model results and are listed here.

- Urban dispersion coefficients (see following discussion)
- Gradual plume rise
- Stack tip downwash
- Buoyancy induced dispersion
- Calm processing
- Default urban wind profile exponents
- Default vertical temperature gradients = 0.02, 0.035
- 10 meter anemometer height

A land use analysis was prepared using the Auer (1978) land use classification system to determine whether the area around the SFERP power plant site is predominantly rural or urban. The analysis determined that the land use surrounding the site is greater than 50 percent urban (approximately 59 percent urban and 41 percent rural); therefore, for this modeling analysis, urban dispersion coefficients have been used.

ISCST3 uses hourly meteorological data to characterize plume dispersion. The representativeness of the data is dependent on the proximity of the meteorological monitoring site to the area under consideration, the complexity of the terrain, the exposure of the meteorological monitoring site, and the period of time during which the data are collected. The meteorological data used in this analysis were collected at the Potrero power plant monitoring station adjacent to the project site. This data set was selected to be representative of meteorological conditions at the SFERP site and to meet the requirements of the USEPA "On-Site Meteorological Program Guidance for Regulatory Model Applications" (USEPA, 1995). The analysis used meteorological data collected during 1992.

USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates in the CAA at section 165(e)(1). Section 165(e)(1) defines on-site meteorology as the collection "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility."

This definition and USEPA's guidance on the use of on-site monitoring data are also outlined in the "On-Site Meteorological Program Guidance for Regulatory Modeling Applications" (USEPA, 1987). The representativeness of the data is dependent upon (a) the proximity of the meteorological monitoring site to the area under consideration, (b) the complexity of the topography of the area, (c) the exposure of the meteorological sensors, and (d) the period of time during which the data are collected. As discussed below, we believe the meteorological data from the Potrero power plant monitoring station satisfy the definition of on-site data. The project site and the Potrero power plant monitoring station are located within approximately 0.5 mile of each other along the southwest side of San Francisco Bay.

The wind roses shown in Figure 8.1-5 for the Potrero monitoring station indicate moderate wind speeds (the average wind speed is approximately 2.8 m/s), with a predominant wind direction of west-southwest and a secondary maximum at west. Analysis of a stability rose of the Potrero monitoring station demonstrates that D stability occurs up to 49 percent of the time for the data set. The predominance of D stability is primarily due to the large frequency of breezy conditions. The Potrero monitoring site and the project site have similar exposure: both are located about 0.5 mile from the elevated terrain and adjacent to San Francisco Bay. The Potrero met data were collected less than 0.5 mile from the project site.

The other two meteorological data sets considered for use in evaluating the impacts of this project are those collected at the San Francisco Waste Water Treatment Plant (WWTP) and at Hunters Point power plant. Both of these data sets were collected at a greater distance from the project site (over a mile away). Both the WWTP and Hunters Point met stations have different exposures to elevated terrain: these sites are located approximately 1 to 1.5 miles east of Bernal Heights, in contrast to the Potrero site which is approximately 0.5 mile east of Potrero Hill. In addition, and the WWTP and Hunters Point sites are just north of the hilly terrain of the Bayview District, while the distances to terrain in the south from both the Potrero site and the project site are much greater. The different exposure to elevated terrain results in a different influence of that terrain on the winds monitored at the site, so that wind speeds and directions monitored at the WWTP and Hunters Point sites are believed to

be less similar to those experienced at the project site than the meteorology at the Potrero site.

Representativeness has also been defined in the "Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as the project site and the Potrero met station clearly are. Representativeness has also been defined in the PSD Monitoring Guideline as data that characterize the air quality for the general area in which the proposed project would construct and operate. The large-scale topographic features that influence the Potrero monitoring station also influence the proposed project site in the same manner.

In determining the representativeness of the Potrero monitoring station relative to the project site, the following considerations were addressed.

Aspect ratio of terrain, which is the ratio of height to width of hill at base - The aspect ratio of the hill near the Potrero monitoring station (Potrero Hill) is identical to that of the terrain near the project site: approximately 300 feet in height to approximately one mile of width at base. The aspect ratio of the largest hill near the WWTP and Hunters Point monitoring sites (Bernal Heights to the west) is different: 440 feet in height to approximately 2 miles of width at base.

Slope of terrain - Terrain in the immediate vicinity surrounding the project site and the Potrero monitoring station is identical: Potrero Hill rises to the west and the bay lies immediately east while the terrain is flat to the north and south. The terrain surrounding the WWTP and Hunters Point monitoring sites is not as similar as the elevated terrain to the west is farther away at both sites. In addition, it is quite hilly immediately south of the WWTP and Hunters Point sites, unlike the flat terrain immediately south of the Potrero met station and the project site.

Correlation of terrain features to prevailing meteorological conditions - As discussed in detail earlier, the orientation and aspect of terrain in the project area correlates well with the prevailing wind fields in the Potrero wind rose. The Potrero monitoring site and the project site have similar exposure to winds that are channeled between Potrero Hill and Bernal Heights, resulting in the prevailing west-southwest and westerly winds at both locations. The west-southwest component is partly blocked at the WWTP and Hunters Point sites by Bernal Heights to the west and by the hilly terrain of the Bayview District to the south.

Thus, it is our assessment that the wind direction and wind speed data collected at the Potrero monitoring station are more representative of dispersion conditions at the project site than are the data collected at the WWTP and Hunters Point.

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used is the Universal Transverse Mercator Projection (UTM). The stack height that can be used in the model is limited by federal and BAAQMD Good Engineering Practice

(GEP) stack height restrictions, discussed in more detail below. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by Good Engineering Practices is not allowed (BAAQMD Regulation 2-2-418). However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the height necessary to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The USEPA guidance ("Guideline for Determination of Good Engineering Practice Stack Height," Revised 6/85) for determining GEP stack height indicates that GEP is the lesser of 65 meters or H_g, where H_g is calculated as follows:

$$H_g = H + 1.5L$$

Where:

H_g	=	Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack
H	=	height of nearby structure(s) measured from the ground-level elevation at the base of the stack
L	=	lesser dimension, height or maximum projected width, of nearby structure(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For the two westernmost turbine stacks, the nearby (influencing) structure is the offsite MUNI terminal building, west of the project site, whose upper tier is 41 feet (12.5 m) high, 549 feet (167.3 m) long and 139 feet (42.4 m) wide. Thus H = L = 41 feet, and H_g = 2.5 * 65 = 102.5 ft, so the proposed stack height of 85 feet does not exceed GEP stack height. For the easternmost turbine stack, the nearby (influencing) structure is the chiller structure, which is 40.0 feet (12.2 m) high, 48.6 feet (14.8 m) wide and 14.3 ft (4.4 m) long. Thus, H generally equals L = 40.0 feet, and H_g = 2.5 * 40.0 = 100.0 ft, so the proposed stack height of 85 feet does not exceed GEP stack height.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. Building dimensions for the buildings analyzed as downwash structures were obtained from plot plans. The building dimensions were analyzed using the Building Profile Input Program (BPIP) to calculate 36 wind-direction-specific building heights and projected building widths for use in building wake calculations. The building dimensions used in the GEP analysis are shown in Appendix 8.1B, Table 8.1B-1, and Figure 8.1B-1.

Screening Procedures and Unit Impact Modeling. To ensure the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the turbine operating conditions that would result in the maximum impacts on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix 8.1B, Table 8.1B-2. These operating conditions represent turbine operation at maximum, typical, and minimum ambient operating temperatures (80°F, 59°F, and 36°F), and at full and minimum (50-percent) loads.

Ambient impacts for each of the six operating cases were modeled using USEPA's ISCST3 model and one year of on-site meteorological data, as described above. The results of the unit impact analysis are presented in Appendix 8.1B, Table 8.1B-3. The analysis showed that for some pollutants and averaging period, modeled impacts were highest under full load operating conditions, while for others, including PM_{10}, impacts were highest under minimum load conditions. The Case 6 stack parameters and emission rates were used in the refined modeling analysis to evaluate the combined impacts of the turbines and cooling towers. For the unit impacts analysis, the CEC staff's recommendation regarding receptor grid spacing has been followed (SFPUC, 2003). (25-meter resolution along the facility fenceline to 100 meters from the fenceline, 100 meter resolution from 100 meters to 1,000 meters from the fenceline, and 250-meter spacing out to as far as 10 km from the site.)

Refined Air Quality Impact Analysis. The stack parameters and emission rates used to model PM_{10} impacts from the SFERP combustion turbines and cooling towers are shown in Appendix 8.1B, Table 8.1B-4. As discussed above, the turbine stack parameters for Case 6 were used in modeling 24-hour and annual average impacts for PM_{10} in complex terrain using the CTSCREEN model and screening meteorological data. The model receptor grids were derived from 30-meter DEM data. The CEC guidance cited above was used to locate receptors. Twenty-five-meter refined receptor grids were used in areas where the coarse grid analyses indicated modeled maxima for each site plan would be located. A map showing the layout of each receptor grid around the site plan is presented in Figure 8.1B-2, Appendix 8.1B.

The unit impact/screening and refined analyses included simple, intermediate, and complex terrain. Terrain features were taken from USGS DEM data and 7.5-minute quadrangle maps of the area including San Francisco North, San Francisco South, Oakland West, Oakland East, Hunters Point, and San Leandro. The coarse grid contained 6,561 receptors at 250-meter resolution and a semi-coarse near-facility grid contained 527 receptors at 100-meter resolution. The refined grids contained 34,549 receptors at 25-meter resolution. In addition, adjacent to the fenceline, four tiers of 152 receptors were present, at 25-meter resolution, for a total of 41,789 receptors.

Specialized Modeling Analyses

Fumigation Modeling. Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground, causing high ground-level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground-level concentrations may be reached during that time. For this analysis, fumigation was assumed to occur for up to 90 minutes, per USEPA guidance.

The SCREEN3 model was used to evaluate maximum ground-level concentrations for short-term averaging periods (24 hours or less). Although this modeling analysis is not required by BAAQMD regulation, guidance from the BAAQMD staff (BAAQMD, 1998) and USEPA (USEPA, 1992) were followed in evaluating fumigation impacts. Since SCREEN3 is a single-source model, a single turbine was modeled and the results multiplied by three. The maximum fumigation impact from the turbines occurred approximately 19 kilometers from the facility. This analysis, which is shown in more detail in Appendix 8.1B, Table 8.1B-5, showed that impacts under fumigation conditions are expected to be lower than the maximum concentrations calculated by ISC under downwash conditions.

Shoreline Fumigation Modeling. Shoreline fumigation modeling is used to determine the impacts as a result of over-water plume dispersion. Because land surfaces tend to both heat and cool more rapidly than water, shoreline fumigation tends to occur on sunny days when the denser cooler air over water displaces the warmer, lighter air over land. During an inland sea breeze, the unstable air over land gradually increases in depth with inland distance. The boundary between the stable air over the water and the unstable air over the land and the wind speed determine if the plume will loop down before much dispersion of the pollutants has occurred.

SCREEN3 can examine sources within 3,000 meters of a large body of water, and was used to calculate the maximum shoreline fumigation impact. The model uses a stable onshore flow and a wind speed of 2.5 meters per second; the maximum ground-level shoreline fumigation concentration is assumed by the model to occur where the top of the stable plume intersects the top of the well-mixed thermal inversion boundary layer (TIBL). The model TIBL height was varied in accordance with BAAQMD procedures (between 2 and 6) to determine the highest shoreline fumigation impact. The worst-case (highest) impact was used in the determining facility impacts due to shoreline fumigation. Shoreline breakup fumigation was assumed to persist for up to 3 hours, in accordance with the meteorological data analysis performed by Dames and Moore for the Potrero 7 application. The shoreline fumigation modeling analysis is shown in more detail in Appendix 8.1B, Table 8.1B-6.

Turbine Startup. Facility impacts were also evaluated during the startup of three turbines simultaneously to evaluate short-term impacts under worst-case startup emissions. Emission rates used for this scenario were based on an engineering analysis of available data, which included source test data from startups of the LM6000PC combustion turbines at the Los Esteros Critical Energy Facility. Turbine exhaust parameters for 50-percent load operation (Cases 4, 5, and 6) were used to characterize turbine exhaust during startup and the CO and NO_x emission rates from Table 8.1-17 were used. Startup impacts were evaluated for the one-hour averaging period using the unit impact modeling results discussed earlier. The calculation of startup impacts is shown in Appendix 8.1B, Table 8.1B-3.

Ozone Limiting. Because the NO_x impacts during facility operation are shown by the modeling to be relatively low, it is assumed that no ozone limiting of NO_x emissions from project operation will occur and the results are reported without ozone correction for either the one-hour or annual impacts.

In accordance with guidance provided by the BAAQMD staff for similar projects, one-hour NO_2 impacts during construction were modeled using ISC3_OLM (Industrial Source Complex, Version 3, Ozone Limiting Method) Model (version 96113). While this version of

ISCST3 is not based on the latest model ISCST3 update, this modeling analysis does not include any features that were affected by recent model updates.

ISC3_OLM uses hourly ozone data to perform ozone-limiting calculations on individual plumes on an hour-by-hour basis. In accordance with guidance provided by the BAAQMD staff for similar projects, the concurrent ozone data collected at the nearest monitoring station to the SFERC, on Arkansas Street, were used for this analysis. Annual NO_x impacts during construction were modeled using ISCST3. NO_x impacts were converted to NO_2 using the USEPA-guidance Ambient Ratio Method and the nationwide default conversion rate of 0.75.

Turbine Commissioning. There are several high emissions scenarios possible during commissioning. The first is the period prior to SCR system and oxidation catalyst installation, when the combustor is being tuned. Under this scenario, NO_x emissions would be high because the NO_x emissions control system would not be functioning and because the combustor would not be tuned for optimum performance. CO emissions would also be high because combustor performance would not be optimized and the CO emissions control system would not be functioning. The second high emissions scenario may occur when the combustor has been tuned but the SCR and oxidation catalyst installation is not complete, and other parts of the turbine operating system are being checked out. Since the combustor would be tuned but the control system installation would not be complete, NO_x and CO levels would again be high. Commissioning activities and expected emissions are discussed in more detail below.

Preconstruction Monitoring. To ensure that the impacts from the SFERC combustion turbines will not cause or contribute to a violation of an ambient air quality standard or an exceedance of a PSD increment, an analysis of the existing air quality in the project area is necessary. If a source is subject to PSD review, BAAQMD rules require preconstruction ambient air quality monitoring data for the purposes of establishing background pollutant concentrations in the impact area (Regulation 2-2-414.3). However, a facility may be exempted from this requirement if the predicted air quality impacts of the facility do not exceed the de minimis levels listed in Table 8.1-21. As the SFERC is not subject to PSD review, the preconstruction monitoring requirements are not applicable to the project.

TABLE 8.1-21
BAAQMD PSD Preconstruction Monitoring Exemption Levels

Pollutant	Averaging Period	De minimis Level
CO	8-hr average	575 $\mu g/m^3$
PM_{10}	24-hr average	10 $\mu g/m^3$
NO_2	annual average	14 $\mu g/m^3$
SO_2	24-hr average	13 $\mu g/m^3$

With the BAAQMD's approval, a facility may rely on air quality monitoring data collected at BAAQMD monitoring stations to satisfy the requirement for preconstruction monitoring. In such a case, in accordance with Section 2.4 of the USEPA PSD guideline, the last three

years of ambient monitoring data may be used if they are representative of the area's air quality where the maximum impacts occur due to the proposed source.

The background data need not be collected on site, as long as the data are representative of the air quality in the subject area (40 CFR 51, Appendix W, Section 9.2). Three criteria are applied in determining whether the background data are representative: (1) location, (2) data quality, and (3) data currentness (USEPA, 1987). These criteria are defined as follows:

- **Location:** The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.
- **Data quality:** Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR Part 58, Appendices A and B, and PSD monitoring guidance.
- **Currentness:** The data are current if they have been collected within the preceding three years and they are representative of existing conditions.

Although the SFERP is not subject to PSD review and thus not required to follow this guidance, all of the data used in this analysis meet the requirements of Appendices A and B of 40 CFR Part 58, and thus all meet the criterion for data quality. All of the data have been collected within the preceding three years, and thus all meet the criterion for currentness.

Ambient NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$ data are collected at the Arkansas Street monitoring station. This monitoring station is located less than 2 miles northwest of the project site. Ambient NO_2, CO, SO_2 and $PM_{2.5}$ data are also being collected at a monitoring station in Hunters Point, a little over 1 mile south of the project site. The ambient pollution levels monitored at the Arkansas Street and Hunters Point monitoring stations reflect concentrations in the vicinity of the project, and thus meet the criterion for location. CO levels are affected mainly by vehicle traffic, so CO concentrations monitored at both urbanized locations are expected to conservatively represent CO levels in the project area. There are no local sources of SO_2 in the vicinity of either monitoring station or the project site that would be expected to affect monitored concentrations. Therefore, both stations provide representative background data for assessing the SO_2 impacts of the project, and thus meet the location criterion.

Results of the Ambient Air Quality Modeling Analyses. The maximum facility impacts calculated from the ISCST3/CTSCREEN and fumigation modeling analyses described previously are summarized in Table 8.1-22. The highest modeled impacts are expected to occur under startup and shoreline fumigation conditions.

Even if the project were subject to PSD review, preconstruction monitoring would not be required because the maximum ambient impacts do not exceed de minimis levels, as shown in Table 8.1-23.

TABLE 8.1-22
Results of the Ambient Air Quality Modeling Analysis

		Modeled Concentration (µg/m3)			
Pollutant	**Averaging Time**	**Normal Operation**	**Startup**	**Inversion Breakup Fumigation**	**Shoreline Fumigation**
NO_2	1-hour	8.3	111.3	1.6	11.0
	Annual	0.1	[a]	–[c]	–[c]
SO_2	1-hour	0.8	[b]	0.2	1.1
	3-hour	0.6	[b]	0.2	1.0
	24-hour	0.1	[b]	0.05	0.1
	Annual	0.01	[b]	–[c]	–[c]
CO	1-hour	8.1	27.8	1.6	10.7
	8-hour	6.3	[a]	0.9	3.3
$PM_{2.5}/PM_{10}$ (including cooling tower)[d]	24-hour	1.2	[b]	0.5	0.9
	Annual	0.2	[b]	–[c]	–[c]

Notes:

[a] Not applicable, because startup emissions are included in the 8-hour and longer-term ("Normal Operation") modeling.

[b] Not applicable, because emissions are not elevated above normal levels during startup.

[c] Not applicable, because inversion breakup and shoreline fumigation are short-term phenomena and as such are evaluated only for short-term averaging periods.

[d] Cooling tower not included in fumigation modeling.

TABLE 8.1-23
Evaluation of Preconstruction Monitoring Requirements

Pollutant	Averaging Time	Exemption Concentration (µg/m^3)	Maximum Modeled Concentration (µg/m^3)	Exceed Monitoring Threshold?
NO_x	annual	14	0.1	No
SO_2	24-hr	13	0.1	No
CO	8-hr	575	6.3	No
PM_{10}	24-hr	10	1.2	No

Impacts During Turbine Commissioning. As discussed previously, NO_2 and CO impacts could be higher during commissioning than under other operating conditions already evaluated. The commissioning period for the project is comprised of several equipment tests. These tests and the associated NO_x and CO emissions are briefly summarized below. The emissions calculations are shown in more detail in Appendix 8.1B, Table 8.1B-7.

- **Full Speed No Load Tests (FSNL)**—The tests include a test of the combustion turbine ignition system, a test to ensure that the CTG is synchronized with its electric generator, and a test of the CTG's overspeed system. During the tests, the heat input to the CTG will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. Worst-case NO_x emission concentrations are expected to be 100 ppm at 15-percent

oxygen, or 35.3 lb/hr at 97 MMbtu/hr. Total operating time for these tests is expected to be about 4 hours per unit (12 hours total), resulting in maximum total NO_x emissions of 424 pounds. Maximum CO emissions are assumed to be 120 ppm at 15-percent oxygen, or 25.7 lb/hr at 97 MMbtu/hr, for a total of 308 pounds CO for the period.

- **Minimum Load Tests**—These tests will occur over several days. During this testing period the CTG combustor water injection rates will be tuned to minimize emissions and steam line checks will be performed. This test period will allow for complete combustion path warm-up, required for removing all debris that could potentially damage the SCR and CO catalysts. During the tests, the heat input to the combustion turbine will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. The average NO_x emission concentration for the period is assumed be 42 ppm at 15-percent oxygen (due to water injection control) at a heat input of 97 MMBtu/hr, or 15 lb/hr NO_x. Total testing is estimated to last approximately 20 hours per unit, or 60 hours, for a total of 900 pounds of NO_x. The worst case CO emission rate is assumed to be equivalent to 17 times the controlled emission rate (14.6 lb/hr), for a total of 876 pounds CO for the period.
- **Full Speed, No Load Tests (SCR Not Operational)**—These tests will occur over approximately a 4-day period. By the beginning of this test period, the water injection at the CTG combustor will be completely tuned. The SCR and CO catalyst will be installed during this testing period, but no ammonia will be injected. During the tests, the heat input to the CTG will be approximately 100 MMBtu/hr or 20 percent of the maximum heat input rating. Testing and commissioning of the spray water (SPRINT) power augmentation system on the CTG combustor will also take place during this second FSNL test. The average NO_x emission concentration for the period is assumed be 30 ppm at 15-percent oxygen (water injection control) at 100 MMBtu/hr, or 35.3 lb/hr NO_x. Total testing is estimated to last up to 24 hours for each CTG, for a total of approximately 2,550 pounds of NO_x from all three units. Again, the worst-case CO emission rate is assumed to be equivalent to 17 times the controlled emissions (25.7 lb/hr), for a total of approximately 1,850 pounds of CO for the period.
- **Multiple Load Tests (SCR and Oxidation Catalyst Fully Operational)**—These tests will occur over approximately a 13-day period. By the beginning of this test period the control systems will be completely tuned and achieving NO_x and CO control at design levels. During the tests, the heat input to each combustion turbine will be approximately 487.3 MMBtu/hr or 100 percent of the maximum heat input rating.

Total heat rate will vary between about 10,000 Btu/kWh and 14,000 Btu/kWh (HHV) during commissioning activities. Average heat rate for the entire commissioning period is expected to be about 10,000 Btu/kWh to 12,000 Btu/kWh (HHV).

The maximum modeled NO_2 and CO impact during commissioning will occur under the turbine operating conditions that are least favorable for dispersion. As shown in the unit impacts analysis, these conditions are expected to occur under part-load, high-temperature conditions (Case 6).

The unit impact modeling results for three turbines emitting 1 g/s each under Case 6 (see Appendix 8.1B, Table 8.1B-3) can be scaled using a NO_x emission rate of 4.45 g/s (35.3 lb/hr) to determine that the maximum modeled 1-hour NO_2 impact during commissioning of three

turbines is not expected to exceed approximately 98 µg/m³. Using the background NO_2 concentration of 141 µg/m³, the total impact will not exceed 239 µg/m³, which is well below the state one-hour NO_2 standard of 470 µg/m³. The turbine screening results can also be scaled to determine that maximum 1-hour CO impacts during commissioning of three turbines are not expected to exceed 72 µg/m³. Combined with the background concentration of 5,000 µg/m³, the total impact will not exceed 5,072 µg/m³, which is well below the state 1-hour CO standard of 23,000 µg/m³.

No additional mitigation will be necessary during the commissioning period. The SFERP air permit and conditions of certification will require that all emissions during commissioning must accrue toward the rolling 12-month emissions limits that will be included in the permit. As offsets and mitigation will be provided for permitted annual emissions, there will be no excess unmitigated emissions from the project during commissioning.

Ambient Air Quality Impacts. To determine a project's air quality impacts, the modeled concentrations are added to the maximum background ambient air concentrations and then compared to the applicable ambient air quality standards. The modeled concentrations have already been presented in earlier tables. The maximum background ambient concentrations are listed in the following text and tables. A detailed discussion of why the data collected at these stations are representative of ambient concentrations in the vicinity of the project was provided in preceding discussions.

Table 8.1-24 presents the maximum concentrations of NO_X, CO, SO_2, PM_{10} and $PM_{2.5}$ recorded between 2001 through 2003 from the Arkansas Street monitoring station,[1] and the available data from the Hunters Point monitoring station.

TABLE 8.1-24
Maximum Background Concentrations, 2001-2004 (µg/m³)

Pollutant	Averaging Period	Arkansas Street Monitoring Station 2001	2002	2003	Hunters Point Monitoring Station 2004[a]
NO_2	1-hour	137	141	135	88
	Annual	36	36	34	n/a
SO_2	1-hour	65	138	62	78
	3-hour	44	52	44	70
	24-hour	21.0	18.4	18.4	28.9
	Annual	5.3	5.3	5.3	n/a
CO	1-hour	5,000	4,375	4,500	1,125
	8-hour	3,644	2,856	3,156	778
PM_{10}	24-hour	67	74	51	36
	Annual	26.3	24.7	22	22
$PM_{2.5}$	24-hour	51	58	33	n/a
	Annual	11.5	13.1	10.1	

Note:
[a] Partial year (June through December).

[1] Complete 2004 monitoring results for the Arkansas Street are not yet available.

Maximum ground-level impacts due to operation of the SFERP are shown together with the ambient air quality standards in Table 8.1-25. Using the conservative assumptions described earlier, the results indicate that the SFERP will not cause or contribute to violations of any state or federal air quality standards, with the exception of the state PM_{10} and state and federal $PM_{2.5}$ standards. For these pollutants, existing concentrations already exceed the state standards.

TABLE 8.1-25
Modeled Maximum Impacts from Facility

Pollutant	Averaging Time	Maximum Facility Impact (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	1-hour	111.3[a]	141	252	470	–
	Annual	0.1	36	36	–	100
SO_2	1-hour	1.1	138	139	655	–
	3-hour	1.0	70	71	–	1,300
	24-hour	0.1	29	29	105	365
	Annual	0.01	5.3	5.3	–	80
CO	1-hour	27.8	5,000	5,028	23,000	40,000
	8-hour	6.3	3,644	3,650	10,000	10,000
PM_{10}	24-hour	1.2	74	75	50	150
	Annual	0.2	26.3	26.5	20	50
$PM_{2.5}$	24-Hour	1.2	58	59	–	65
	Annual	0.2	13.1	13.3	12	15

[a] Maximum 1-hour NO_2 impact shown occurs only during simultaneous startup of three turbines. Maximum impact during routine turbine operation will be approximately 8.3 µg/m^3.

PSD Increment Consumption. The Prevention of Significant Deterioration (PSD) program was established to allow emission increases (increments of consumption) that do not result in significant deterioration of ambient air quality in areas where criteria pollutants have not exceeded the National Ambient Air Quality Standards (NAAQS). For the purposes of determining applicability of the PSD program requirements, the following regulatory procedure is used:

- SFERP facility-wide emissions are compared with regulatory significance thresholds to determine whether the facility is major and thus may be subject to PSD. If the facility emissions exceed these thresholds, it is a major facility. The comparison in Table 8.1-26 indicates that the SFERP will not be a major facility and thus is not subject to PSD.
- If an ambient impact analysis is required, the analysis is first used to determine if the impact levels are significant. The determination of significance is based on whether the impacts exceed established significance levels (BAAQMD Rule 2.2-233) shown in Table 8.1-27. If the significance levels are not exceeded, no further analysis is required.
- If the significance levels are exceeded, an analysis is required to demonstrate that the allowable increments will not be exceeded, on a pollutant-specific basis. Increments are the maximum increases in concentration that are allowed to occur above the baseline concentration. These PSD increments are also shown in Table 8.1-27.

Table 8.1-26 shows that the proposed project will not be a major stationary source and will not be subject to PSD review because facility emissions of all pollutants are below the 100-tpy major facility and the PSD significance thresholds.

TABLE 8.1-26
PSD Significant Emissions Levels

Pollutant	Facility Emissions (tpy)	PSD Threshold (tpy)	Significant?
NO_X	39.8	250	No
SO_2	2.7	250	No
POC	7.7	250	No
CO	27.9	250	No
PM_{10} [a]	18.2	250	No

[a] PM_{10} emissions shown include cooling tower.

TABLE 8.1-27
BAAQMD PSD Levels of Significance

Pollutant	Averaging Time	Significant Impact Levels	Maximum Allowable Increments
NO_2	1-Hour	19 $\mu g/m^3$	N/A[a]
	Annual	1 $\mu g/m^3$	25 $\mu g/m^3$
SO_2	3-hour	25 $\mu g/m^3$	512 $\mu g/m^3$
	24-Hour	5$\mu g/m^3$	91 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	20 $\mu g/m^3$
CO	1-Hour	2,000 $\mu g/m^3$	N/A
	8-Hour	500 $\mu g/m^3$	N/A
PM_{10}	24-Hour	5 $\mu g/m^3$	30 $\mu g/m^3$
	Annual	1 $\mu g/m^3$	17 $\mu g/m^3$

[a] The significance level for 1-hour average NO_2 is a BAAQMD level only; there is no corresponding federal significance level.

The maximum modeled impacts from the SFERP facility are compared with the significance levels in Table 8.1-28. These comparisons show that the proposed project exceeds only the BAAQMD 1-hour average NO_2 significance level, and only during startup of three turbines simultaneously. During routine plant operations, maximum one-hour NO_2 concentrations will be below the BAAQMD significance threshold. As discussed previously, however, the project emissions are below levels that would trigger PSD review either by USEPA or by the BAAQMD, so no further analysis of modeled impacts is required.

TABLE 8.1-28
Comparison of Maximum Modeled Impacts and PSD Significance Thresholds

Pollutant	Averaging Time	Maximum Modeled Impacts (µg/m3)	Significance Threshold (µg/m3)	Significant?
NO_2	1-Hour	111.3	19	yes
	Annual	0.1	1	no
SO_2	3-Hour	1.0	25	no
	24-Hour	0.1	5	no
	Annual	0.01	1	no

TABLE 8.1-28
Comparison of Maximum Modeled Impacts and PSD Significance Thresholds

Pollutant	Averaging Time	Maximum Modeled Impacts (μg/m3)	Significance Threshold (μg/m3)	Significant?
CO	1-Hour	27.8	2,000	no
	8-Hour	6.3	500	no
PM_{10}	24-Hour	1.2	5	no
	Annual	0.2	1	no

[a] NO_2 impact shown occurs only during the startup of three turbines simultaneously. Under typical operating conditions, 1-hour average NO_2 concentration will be 8.3 $\mu g/m^3$.

8.1.5.5 Screening Health Risk Assessment

The screening health risk assessment (SHRA) was conducted to determine expected impacts on public health of the noncriteria pollutant emissions from the facility. The SHRA was conducted in accordance with the California Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics "Hot Spots" Program Risk Assessment Guidelines (June 2002) and the BAAQMD "Risk Management Procedure" Policy (May 1991). The SHRA estimated the offsite cancer risk to the maximally exposed individual (MEI), as well as indicated any adverse effects of non-carcinogenic compound emissions. The CARB/OEHHA HARP computer program was used to evaluate multipathway exposure to toxic substances. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those estimated.

A health risk assessment requires the following information:

- Carcinogenic potency values for any carcinogenic substances that may be emitted
- Noncancer Reference Exposure levels (RELs) for determining non-carcinogenic health impacts
- One-hour and annual average emission rates for each substance of concern
- The modeled maximum offsite concentration of each of the pollutants emitted

The SHRA uses carcinogenic potency factors specified by the California OEHHA. All of the pollutant cancer risks are assumed to be additive.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the SHRA. Many of the carcinogenic compounds are also associated with noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. However, exceeding the REL does not automatically indicate a health impact. The OEHHA reference exposure levels were used to determine any adverse health effects from noncarcinogenic compounds. A hazard index for each noncancer pollutant is then determined by the ratio of the pollutant annual average concentration to its respective REL for a chronic evaluation. The individual indices are summed to determine the overall hazard index for the project.

Because noncancer compounds do not target the same system or organ, this sum is considered conservative. The same procedure is used for the acute evaluation.

The SFERP SHRA results are compared with the established risk management procedures for the determination of acceptability. The established risk management criteria provides that if the potential increased cancer risk is less than one in a million, the facility risk is considered not significant.

The SHRA includes the noncriteria pollutants listed in Table 8.1-22. The receptor grid described earlier for criteria pollutant modeling was used for the SHRA. The SHRA results for the SFERP are presented in Table 8.1-29, and the detailed calculations are provided in Appendix 8.1C. The locations of the maximum modeled risks are shown in Figure 8.1C-1.

TABLE 8.1-29
Screening Health Risk Assessment Results

Cancer Risk to Maximally Exposed Individual[a]	0.046 in one million
Cancer Risk at Nearest Residence[b]	0.0008 in one million
Cancer Risk at Nearest Workplace	0.0001 in one million
Acute Inhalation Hazard Index	0.03
Chronic Inhalation Hazard Index	0.002

[a] Value shown reflects high-end point estimate. 70-year cancer risk estimates range from 0.022 in one million to 0.046 in one million.

[b] Value shown reflects high-end point estimate.

The screening HRA results indicate that the acute and chronic hazard indices are well below 1.0, so, pursuant to established risk management criteria, are not significant. The cancer risk to a maximally exposed individual is 0.05 in one million, well below the one in one million level. The screening HRA results indicate that, overall, the SFERP project will not pose a significant health risk at any location.

8.1.5.6 Construction Impacts Analysis

Emissions due to the construction phase of the project have been estimated, including an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A dispersion modeling analysis was conducted based on these emissions. A detailed analysis of the emissions and ambient impacts is included in Appendix 8.1D. The results of the analysis indicate that the maximum construction impacts will be below the state and federal standards for all the criteria pollutants emitted. The best available emission control techniques will be used, including dust reduction measures set forth in the Environmental Code, Chapter 10 and in Department of Public Works Order 171,378 during construction. The SFERP construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust-suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards.

Combustion Diesel PM_{10} emission impacts have also been evaluated. This risk screening analysis is also included in Appendix 8.1D.

8.1.6 Consistency with Laws, Ordinances, Regulations and Standards

8.1.6.1 Consistency with Federal Requirements

The BAAQMD has been delegated authority by the USEPA to implement and enforce most federal requirements that may be applicable to the SFERP, including the new source performance standards and new source review for nonattainment pollutants. Compliance with the BAAQMD regulations ensures compliance and consistency with the corresponding federal requirements as well. The SFERP will also be required to comply with the Federal Acid Rain requirements (Title IV). Since the BAAQMD has received delegation for implementing Title IV through its Title V permit program, the SFERP will secure a BAAQMD Title V permit that imposes the necessary requirements for compliance with the Title IV Acid Rain provisions.

8.1.6.2 Consistency with State Requirements

State law sets up local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed previously, the SFERP is under the local jurisdiction of the BAAQMD, and compliance with BAAQMD regulations will ensure compliance with state air quality requirements.

8.1.6.3 Consistency with Local Requirements: Bay Area Air Quality Management District

The BAAQMD has been delegated responsibility for implementing local, state, and federal air quality regulations in portions of the nine counties surrounding San Francisco Bay. The SFERP project is subject to BAAQMD regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants. The following sections include the evaluation of facility compliance with the applicable BAAQMD requirements.

Under the regulations that govern new sources of emissions, the SFERP is required to secure a preconstruction Determination of Compliance from the BAAQMD (Regulation 2, Rule 3), as well as demonstrate continued compliance with regulatory limits when the facility becomes operational. The preconstruction review includes demonstrating that the combustion turbines will use best available control technology (BACT) and will provide any necessary emission offsets.

Applicable BACT levels are shown in Table 8.1-30, along with anticipated potential facility emissions. BAAQMD Rule 2-2-301 requires the SFERP to apply BACT to any source that has an increase in emissions of NO_x, POC, SO_x, CO, and PM_{10} (criteria pollutants) and that has a potential to emit in excess of 10.0 pounds per highest day. Rule 2.2-301.2 imposes BACT for emissions of lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds when emitted in excess of specified amounts. The SFERP facility will not emit any of these latter pollutants in detectable quantities; therefore, Rule 2-2-301.2 is not applicable to the proposed project. As shown in the table, BACT is required for NO_x, POC, SO_2, CO, and PM_{10}. The calculation of facility emissions was discussed in AFC Section 8.1.5.1.1.

TABLE 8.1-30
Facility Best Available Control Technology Requirements

Pollutant	Applicability Level	Facility Emission Level (lbs/day)	BACT Required?
Criteria Pollutants: BAAQMD Regulation 2-2-301.1			
POC	10 lbs/day	97.8	yes
NPOC	10 lbs/day	–	no
NO_x	10 lbs/day	744.6	yes
SO_2	10 lbs/day	32.3	yes
PM_{10}	10 lbs/day	216.9	yes
CO	10 lbs/day	378.0	yes
Noncriteria Pollutants: BAAQMD Regulation 2-2-301.2			
Lead	3.2 lbs/day	neg.	no
Asbestos	0.04 lbs/day	neg.	no
Beryllium	0.002 lbs/day	neg.	no
Mercury	0.5 lbs/day	neg.	no
Fluorides	16 lbs/day	neg.	no
Sulfuric Acid Mist	38 lbs/day	neg.	no
Hydrogen Sulfide	55 lbs/day	neg.	no
Total Reduced Sulfur	55 lbs/day	neg.	no
Reduced Sulfur Compounds	55 lbs/day	neg.	no

BACT for the applicable pollutants was determined by reviewing the BAAQMD BACT Guidelines Manual, the South Coast Air Quality Management District BACT Guidelines Manual, the most recent Compilation of California BACT Determinations, CAPCOA (2nd Ed., November 1993), and USEPA's BACT/LAER Clearinghouse. A summary of the review is provided in Appendix 8.1E. For the combustion turbines, the BAAQMD considers BACT to be the most stringent level of demonstrated emission control that is feasible. The SFERP facility will use the BACT measures discussed next.

As a BACT measure, the SFERP will limit the fuels burned in the new combustion turbines to natural gas, a clean-burning fuel. Burning of liquid fuels in the combustion turbine combustors would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This measure acts to minimize the formation of all criteria air pollutants.

BACT for NO_x emissions from the combustion turbines will be the use of low NO_x emitting equipment and add-on controls. The SFERP will use a selective catalytic reduction (SCR) system to reduce NO_x emissions to 2.5 ppmvd NO_x, corrected to 15 percent O_2 on a three-hour average basis. The BAAQMD BACT guidelines indicate that BACT from large, simple-cycle combustion turbines (≥40 MMBtu/hr heat input) is an exhaust concentration of

2.5 ppmvd NO_x, corrected to 15 percent O_2; therefore, the proposed combustion turbines will meet the BACT requirements for NO_x. The BAAQMD BACT Guideline determination for NO_x from combustion turbines is shown in Appendix 8.1E.

BACT for CO emissions will be achieved by using oxidation catalysts to reduce CO emissions to 4.0 ppmvd, corrected to 15 percent O_2. Recent BAAQMD BACT determinations indicate that BACT from large, simple-cycle combustion turbines (≥40 MMBtu/hr heat input) is 6 ppmvd CO, corrected to 15 percent O_2. A review of recent BACT determinations for CO from combustion turbines is provided in Appendix 8.1E.

BACT for POC emissions will be achieved by use of good combustion practices in the combustion turbines. BACT for POC emissions from combustion devices has historically been the use of best combustion practices. POC emissions leaving the stacks will not exceed 2.0 ppmvd, corrected to 15 percent oxygen. This level of emissions is consistent with recent BACT determinations for similar projects.[2]

For the turbines, BACT for PM_{10} is best combustion practices and the use of gaseous fuels. BAAQMD BACT Guideline 89.1.6 specifies BACT 2 (achieved in practice) for SO_2 for combined cycle combustion turbines with an output rating of ≥ 50 MW as the exclusive use of clean-burning natural gas with a sulfur content of < 1.0 grains per 100 scf. The proposed turbines will burn exclusively PUC-regulated natural gas with an expected average sulfur content of 0.33 grains per 100 scf, which will result in minimal SO_2 emissions.

In addition to the BACT requirements, BAAQMD regulation 2-2-302 requires the project to provide full emission offsets when emissions exceed specified levels on a pollutant-specific basis. As shown in Table 8.1-31, the SFERP will be required to provide emission offsets for NO_x emissions.

TABLE 8.1-31
BAAQMD Offset Requirements and Facility Emissions

Pollutant	Applicable Facility Size	Emission Increase	Facility Emissions	Regulation	Offsets Required
POC	10 tpy	Any increase	7.7 tpy	2-2-302	No
NO_x	10 tpy	Any increase	39.8 tpy	2-2-302	Yes
PM_{10}	100 tpy	1 tpy net increase	18.2 tpy	2-2-303	No
SO_2	100 tpy	1 tpy net increase	2.7 tpy	2-2-303	No

Section 2-302 requires NO_x emission reduction credits to be provided at an offset ratio of 1.15:1 because facility emissions will exceed 35 tpy. POC offsets are not required because facility POC emissions are less than 10 tpy. Both POC and NO_x contribute to the Bay Area Air Basin ozone levels. As discussed further on, the SFERP is proposing to provide 47.5 tons of NO_x offsets, resulting in an effective offset ratio of 1.19:1. As shown in Table 8.1-32 below, the 47.5 tons of NO_x ERCs that are being provided will be adequate to mitigate all of the ozone precursor emissions from the project at a ratio of 1.0:1.

Section 2-303 requires offsets for emissions increases at facilities that emit more than 100 tpy of SO_2 and PM_{10}. As facility emissions of SO_2 and PM_{10} will be below 100 tpy, offsets are not

[2] Although the turbines will be equipped with oxidation catalysts, no POC control effectiveness has been assumed.

required for these pollutants. As shown in Table 8.1-31, the maximum SO_2 and PM_{10} impacts from the proposed project are well below the significance thresholds so are not considered significant, and no mitigation is necessary under BAAQMD rules.

Sections 2-304 and 2-305 impose emissions offset requirements, or require project denial, if SO_2, NO_2, PM_{10}, or CO air quality modeling results indicate emissions will interfere with the attainment or maintenance of the applicable ambient air quality standards or will exceed PSD increments. As discussed above, BAAQMD regulations do not require the SFERP to conduct these analyses, since the facility is not subject to PSD review and is not a major source. However, modeling for these pollutants has been conducted to satisfy CEC requirements. The modeling analyses show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards.

Emissions offset requirements for NO_x and POC are shown in Table 8.1-32. SFPUC has signed an option agreement for the purchase of sufficient ERCs from Certificate No. 896 to provide the necessary offsets for the project.

TABLE 8.1-32
Facility Offset Requirements

Pollutant	Net Increase in Emissions (tpy)	Required Offset Ratio	Offsets Required (tpy)	Offsets to be Provided (tpy)	Effective Offset Ratio
NO_x	39.8	1.15:1	45.77	47.5	1.19:1
POC	7.7	N/A	0	0	N/A
Total (NO_x + POC)	47.5	N/A	N/A	47.5	1.0:1
NO_x ERCs optioned from Certificate No. 896	--	--	--	47.5	--

As discussed in AFC Section 8.1.4, Regulatory Setting, the BAAQMD PSD program requirements apply on a pollutant-specific basis to:

- A new major facility that will emit 100 tpy or more, or a major modification to an existing major facility
- A facility that emits 100 tpy or more, with net emissions increases since the applicable PSD baseline date that exceed the modeling threshold levels shown in Table 8.1-33

The SFERP will not be a major source. Therefore, it is not subject to the USEPA and BAAQMD PSD regulations. The BAAQMD modeling threshold requirements and their applicability to the proposed project are shown in Table 8.1-33.

Rule 2-2-308 requires applicants to demonstrate that emissions from a project located within 10 kilometers (6.2 miles) of a Class I area will not cause or contribute to the exceedance of any national ambient air quality standard or any applicable Class I PSD increment. Because the nearest Class I areas, Point Reyes National Seashore and Pinnacles National Park, are farther than 10 km from the SFERP, this section is not applicable to the proposed facility.

TABLE 8.1-33
BAAQMD PSD Requirements Applicable to 100 tpy Fossil Fuel Fired Power Plants

Pollutant	PSD Facility Applicability Level	Modeling Threshold Level	Emissions from New Facility	Modeling Required	Applicable BAAQMD Regulation
NO_X	100 tpy	100 tpy	39.8 tpy	No	2-2-304.2
SO_2	100 tpy	100 tpy	2.7 tpy	No	2-2-304.2
PM_{10}[a]	100 tpy	100 tpy	18.2 tpy	No	2-2-304.3
CO	100 tpy	100 tpy	27.9 tpy	No	2-2-305.1
POC	100 tpy	not required	7.7 tpy	–	–

[a] All particulate matter from the combustion turbines is assumed to be emitted as PM_{10}.

Rule 2-2-306 is also not applicable to the SFERP. This section requires modeling analyses for specific noncriteria pollutants (lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds) if they are emitted in significant quantities and if the facility emits more than 100 tons per year of any criteria pollutant. As the project is not a major source and will not emit significant quantities of the specific noncriteria pollutants, a noncriteria pollutant modeling analysis under this section is not required. However, a screening health-risk assessment has been conducted for potential emissions of toxic air contaminants. The analysis methodology and results are discussed in Subsection 8.1.5.4.

Rule 2-2-418 requires the use of Good Engineering Practices (GEP) stack height. Conformance with the GEP stack height requirement was demonstrated in the modeling analysis conducted for the proposed project.

Regulation 2, Rule 6, Major Facility Review (Title V permit program), applies to major facilities and phase II acid rain facilities. Although the project is not a major facility, it is a phase II acid rain facility. Under the Title V permit program, the SFERP will be required to file an application for an operating permit within 12 months of facility startup. The Phase II acid rain requirements will also apply to the SFERP. As a Phase II Acid Rain facility, the SFERP will be required to provide sufficient allowances for every ton of SO_2 emitted during a calendar year. The SFERP will obtain the necessary allowances on the current open trade market. The SFERP will also be required to install and operate continuous monitoring systems; BAAQMD enforcement of its rules will ensure installation of these systems.

The general prohibitory rules of the BAAQMD applicable to the proposed project and the determination of compliance follow.

Regulation 1-301 addresses public nuisance. The new facility will emit insignificant quantities of odorous or visible substances; therefore, the project will comply with this regulation.

Regulation 6 pertains to particulate matter and visible emissions. Any visible emissions from the project will not be darker than No. 1 when compared to a Ringelmann Chart for any period(s) aggregating 3 minutes in any hour. Because the new turbines will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating

3 minutes in any hour and the particulate emission concentrations limit of 0.15 grains per standard cubic feet of exhaust gas volume will not be exceeded.

Regulation 7, Odorous Substances, is not applicable to the proposed project. Combustion turbine operations do not result in odor complaints.

Regulation 9, Rule 1, Sulfur Dioxide, specifies an emission standard of less than 300 ppm SO_2. Because of the insignificant quantities of sulfur in natural gas, this limit will be achieved. In addition, the ambient air quality modeling analysis discussed in Subsection 8.1.5.3.1 shows that ground-level concentrations of SO_2 from the proposed project will not result in ground-level concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours.

Regulation 9, Rule 2, pertains to hydrogen sulfide. The combustion turbines are not expected to emit H_2S.

Regulation 9, Rule 3, Nitrogen Oxides From Heat Transfer Operations, imposes a NO_x limit of 125 ppm. The proposed project will easily comply with this rule.

Regulation 9, Rule 9, limits the emissions of nitrogen oxides from combustion turbines during baseload operations to less than 9 ppmv corrected to 15 percent O_2. The proposed NO_x level of 2.5 ppmvd, corrected to 15 percent O_2, will satisfy the requirements of this rule. In addition, the continuous emission monitoring (CEM) system that the SFERP will install will also satisfy the monitoring and recordkeeping requirements of this rule.

BAAQMD Regulation 10 (40 CFR 60 Subpart GG) adopts by reference the federal New Source Performance Standards (NSPS) for stationary gas turbines. This regulation requires monitoring of fuel; imposes limits on the emissions of NO_x, SO_2, and PM_{10}; and requires source testing of stack emissions, process monitoring, and data collection and recordkeeping. All of the BACT limits imposed on the new turbines will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule. The SFERP will comply with the NSPS regulations.

8.1.6.4 Consistency with San Francisco Board of Supervisors Ordinance No. 124-01 and Resolutions No. 827-02 and 458-03

In May 2001 the San Francisco Board of Supervisors adopted Ordinance No. 124-01. This ordinance adopts minimum requirements for the protection of human health and the environment for any proposed new electric generation at the Potrero Power Plant and requires approval by the Board of Supervisors for any agreement by City officials or departments for or related to new electrical generation in Southeast San Francisco. The ordinance calls for the Board to work with the SFPUC and the Department of the Environment to adopt a new electricity resource plan for San Francisco. The Board has also adopted Resolution No. 827-02, which adopted the Electricity Resource Plan prepared by the SFPUC and ENV as policy guidelines, and Resolution No. 458-03, which opposes the Potrero Unit 7 power plant project. Section 3, Purpose and Need and Section 4, Environmental Justice describe how the project meets the requirements of these Ordinances and Resolutions. The project facilitates the closure of existing, dirty within-City generation

while maintaining electrical reliability and is designed to minimize its impact on the community in Southeast San Francisco. Also, the City is developing, with community input, a PM_{10} mitigation/community benefits package and will target the mitigation to the areas affected by the impacts from the project. Moreover, project financing and key contracts are subject to approval by the Board of Supervisors.

8.1.7 Cumulative Air Quality Impacts Analysis

An analysis of potential cumulative air quality impacts that may result from the proposed combustion turbines and other reasonably foreseeable projects is generally required only when project impacts are significant.

To ensure that potential cumulative impacts of the SFERP and other nearby projects are adequately considered, a cumulative impacts analysis has been conducted and is included as Appendix 8.1F.

8.1.8 Mitigation

Mitigation will be provided for all emissions increases from the project in the form of offsets and the installation of BACT, as required under BAAQMD regulations. For PM_{10}, applicant is working with the community to develop a mitigation plan.

The process to develop the plan, and the measures that have been identified as most promising to date, are described in further detail in Section 4, Environmental Justice.

8.1.9 References

AVER. 1978.

Bay Area Air Quality Management District (BAAQMD). 1998. BAAQMD draft comments on Calpine's September 21, 1998, modeling protocol for the Delta Energy Center Project. October 22.

California Air Resources Board (CARB). 1989. Reference Document for California Statewide Modeling Guideline. April.

California Air Resources Board (CARB). 1997. Emission Inventory Criteria and Guidelines Report for the Air Toxics "Hot Spots" Program. May 15.

California Air Resources Board (CARB). 1999. Proposed Guidance for Power Plant Siting and Best Available Control Technology. June 23.

California Air Resources Board (CARB). 2003. HARP User Guide. December.

California Air Resources Board (CARB). 2003a. Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk. June.

California Air Resources Board (CARB). 2004. Report to the Legislature: Gas-Fired Power Plant NO_x Emission Controls And Related Environmental Impacts. May.

California Air Resources Board (CARB). 2005. http://www.arb.ca.gov/adam

CAPCOA. 1993. Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines. October.

City of San Francisco. 2005. San Francisco Convention and Visitors Bureau website, http://www.sfvisitor.org/visitorinfo/html/weatherforecast.html

NAPPO, et al. 1982. Workshop on the Representativeness of Meteorological Observations.

Office of Environmental Health Hazard Assessment (OEHHA). 2002. Air Toxics Hot Spots Program Risk Assessment Guidelines. Part II. Technical Support Document for Describing Available Cancer Potency Factors. December.

Office of Environmental Health Hazard Assessment (OEHHA). 2003. Adoption of Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments. October.

Office of Environmental Health Hazard Assessment (OEHHA). 2004. Acute and Chronic Exposure Levels. October.

Dames and Moore. 2000. Application for Certification, Potrero Power Plant Unit 7 Project: Section 8.1, Air Quality, and Appendix F, Air Quality Data and Modeling Protocol, May.

San Francisco Public Utilities Commission (SFPUC). 2003. "SFPUC, San Francisco Electric Reliability Power Project. Final Modeling Protocol." November.

Smith, T. B., W. D. Sanders, and D. M. Takeuchi. 1984. Application of Climatological Analysis to Minimize Air Pollution Impacts in California, Final Report on CARB Agreement A2-119-32. August.

South Coast Air Quality Management District. 1998. "Risk Assessment Procedures for Rules 1401 and 212," Version 4.1, November.

U.S. Department of Commerce, Weather Bureau. 1959. "Climate of the States—California," December.

USEPA. 1985. Guideline for Determination of Good Engineering Practice Stack Height. June.

USEPA. 1987. Ambient Monitoring Guidelines for Prevention of Significant Deterioration (PSD), USEPA-450/4-87-007. May.

USEPA. 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised, USEPA-454/R-92-019. October.

USEPA. 1995. On-Site Meteorological Program Guidance for Regulatory Model Applications, USEPA-450/4-87-013. August.

USEPA. 1999. Guideline on Air Quality Models, 40 CFR, Part 51, Appendix W. July 1.

USEPA. 2000. Compilation of Emission Factors. AP-42. Revised July.

USEPA. 2005. www.epa.gov.

Figure 8.1-1
January Predominant Mean Circulation of the Surface Winds

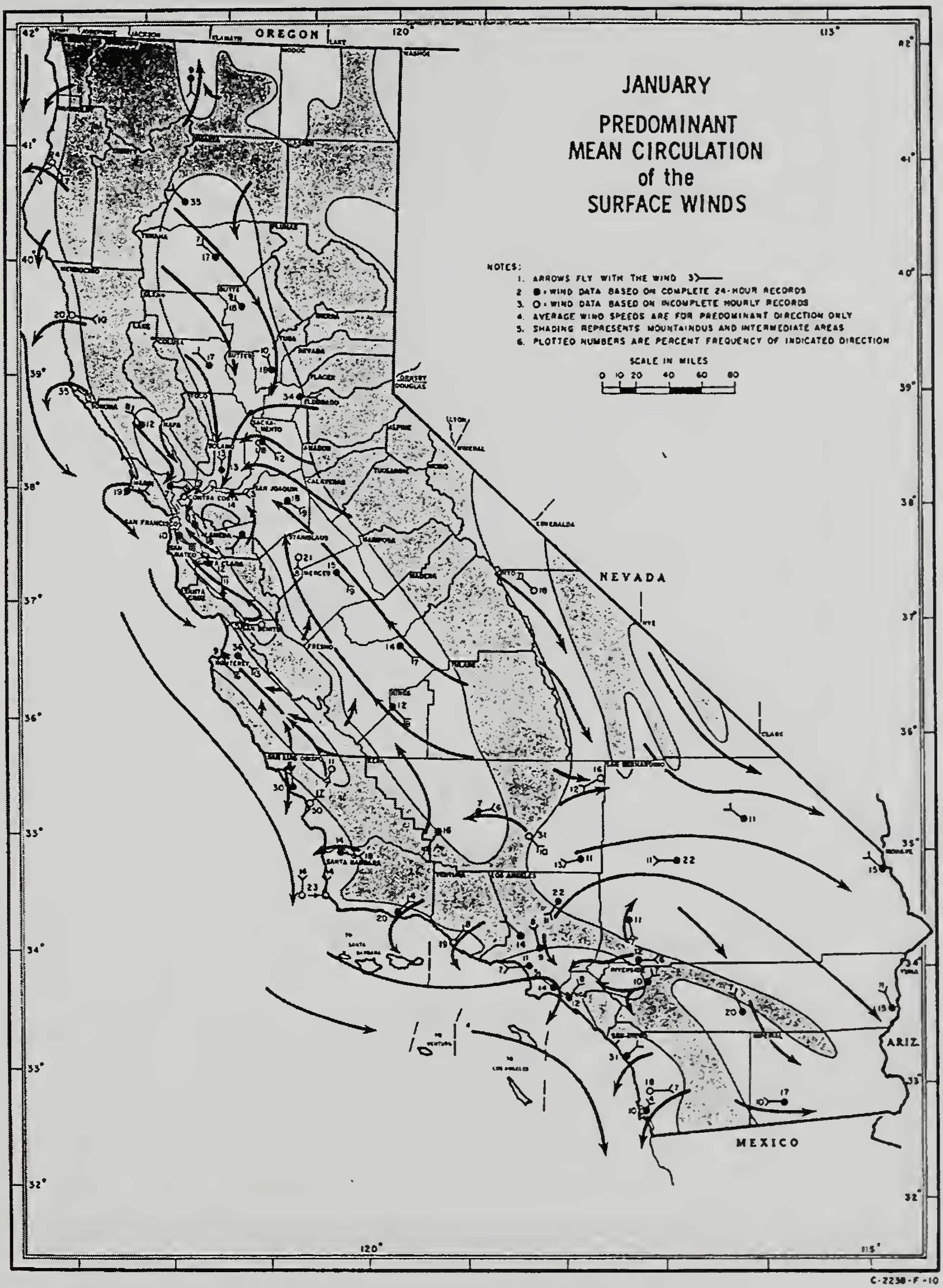


Figure 8.1-2
April Predominant Mean Circulation of the Surface Winds

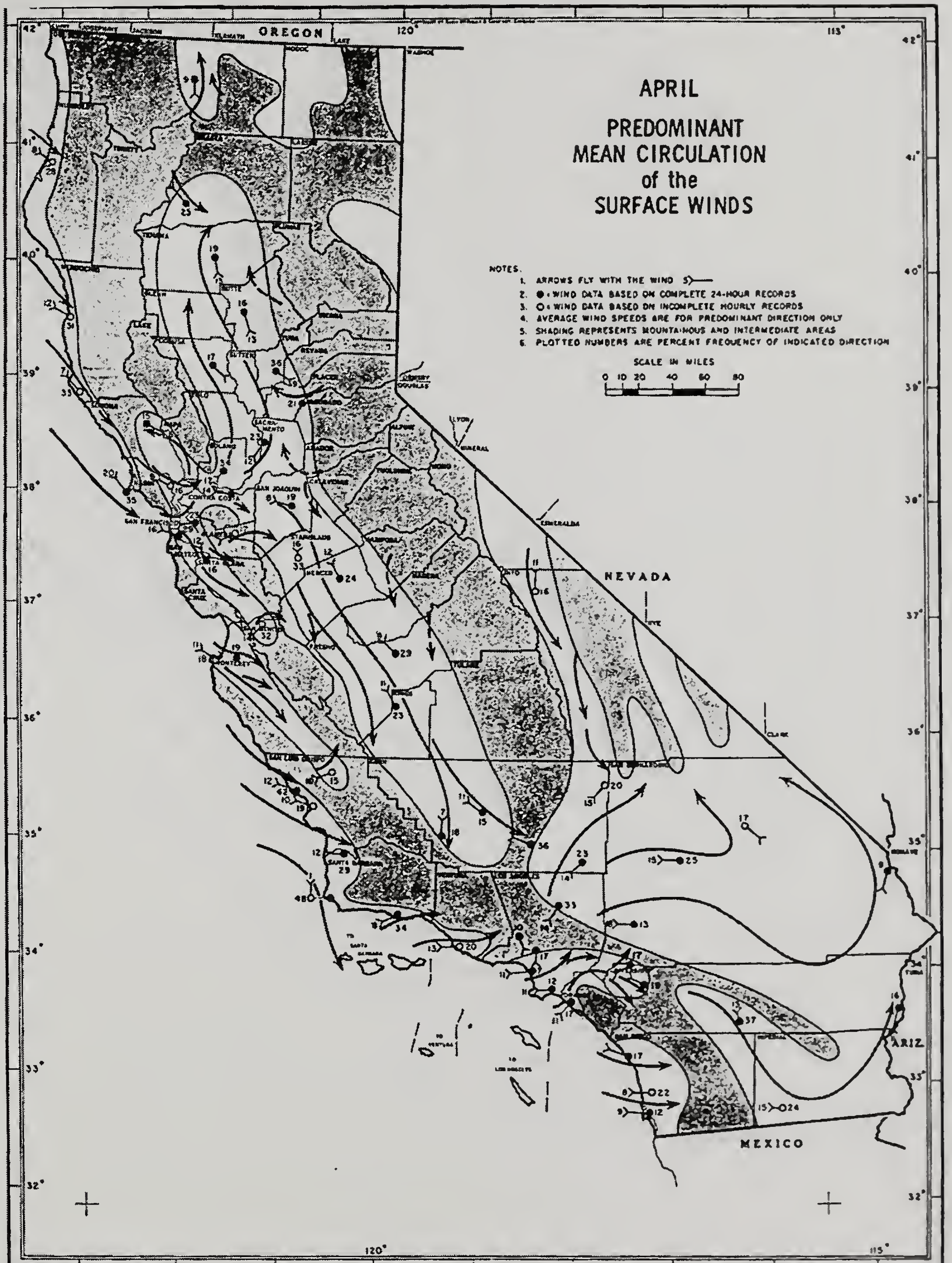


Figure 8.1-3
July Predominant Mean Circulation of the Surface Winds

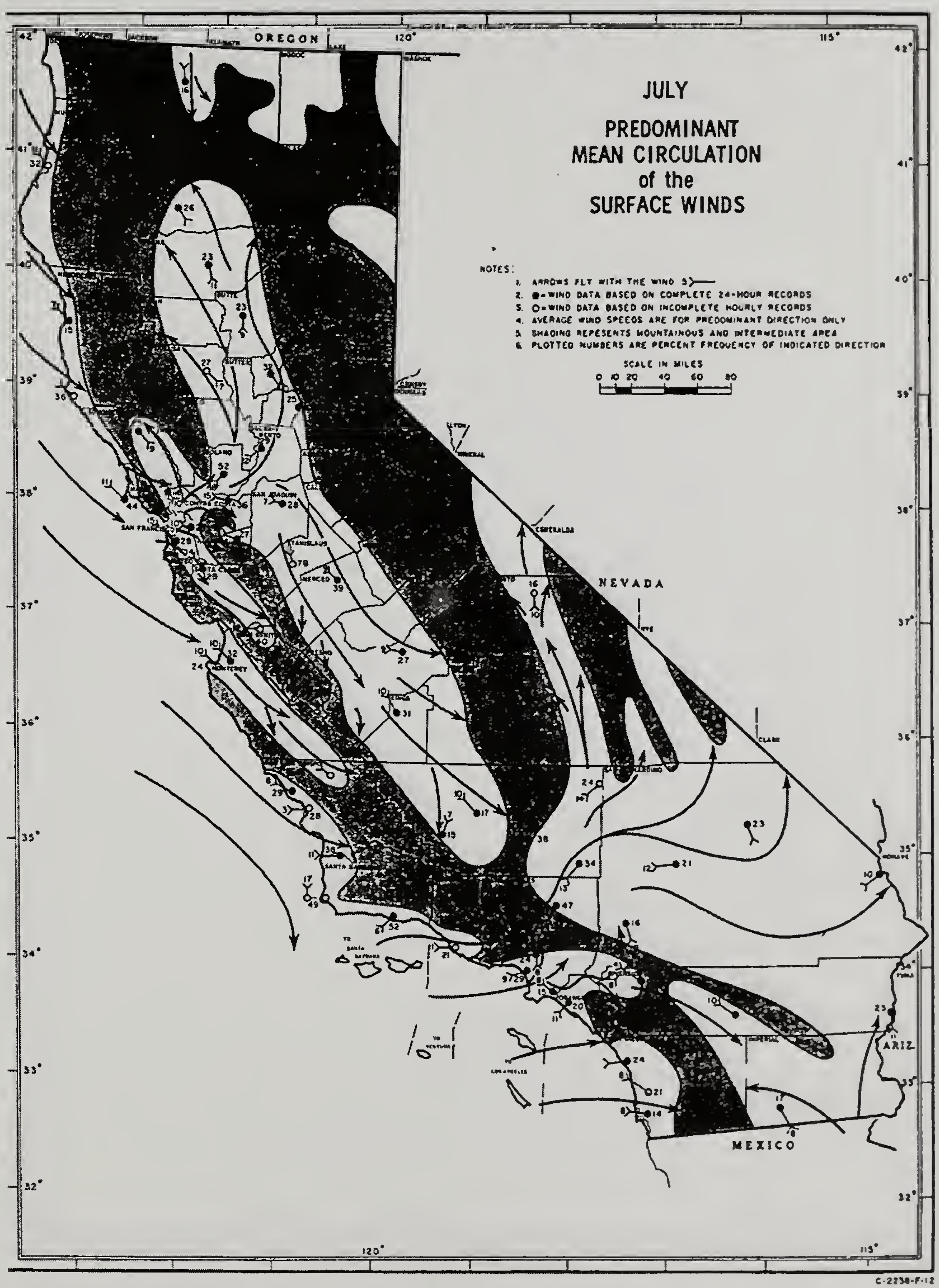


Figure 8.1-4
October Predominant Mean Circulation of the Surface Winds

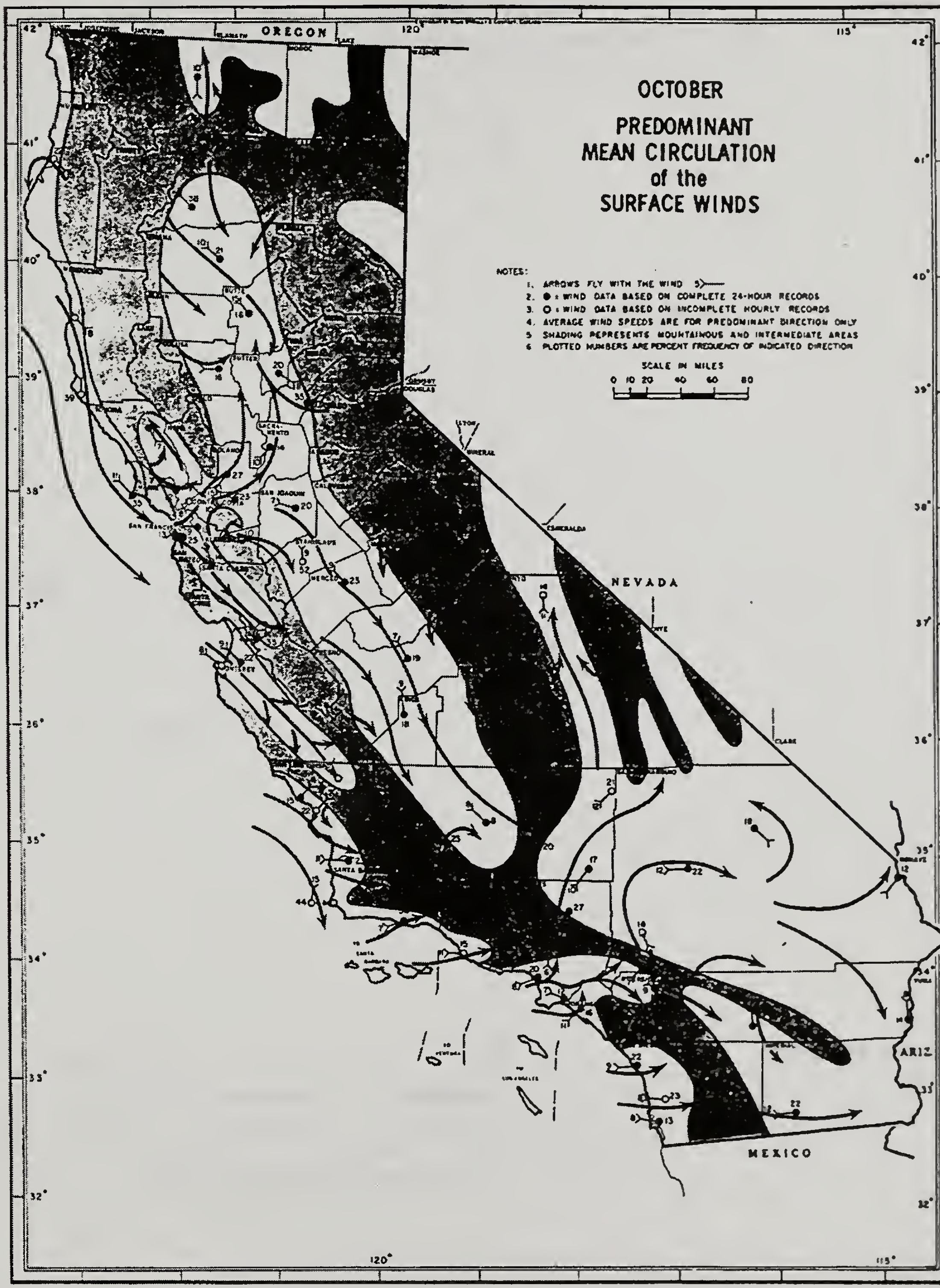


Figure 8.1-5a
Annual Wind Rose, 1992

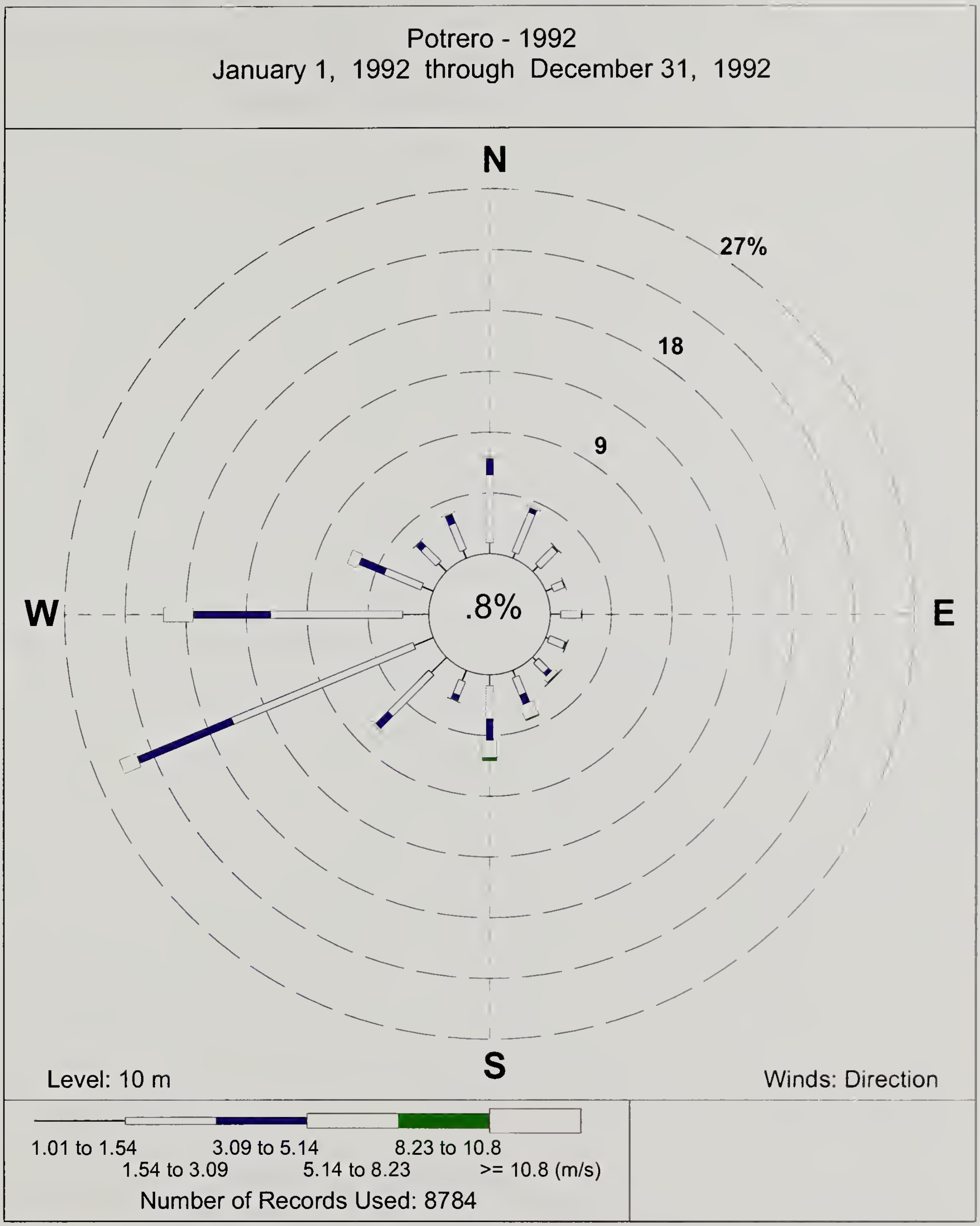


Figure 8.1-5b
Quarterly Wind Rose,
First Quarter 1992

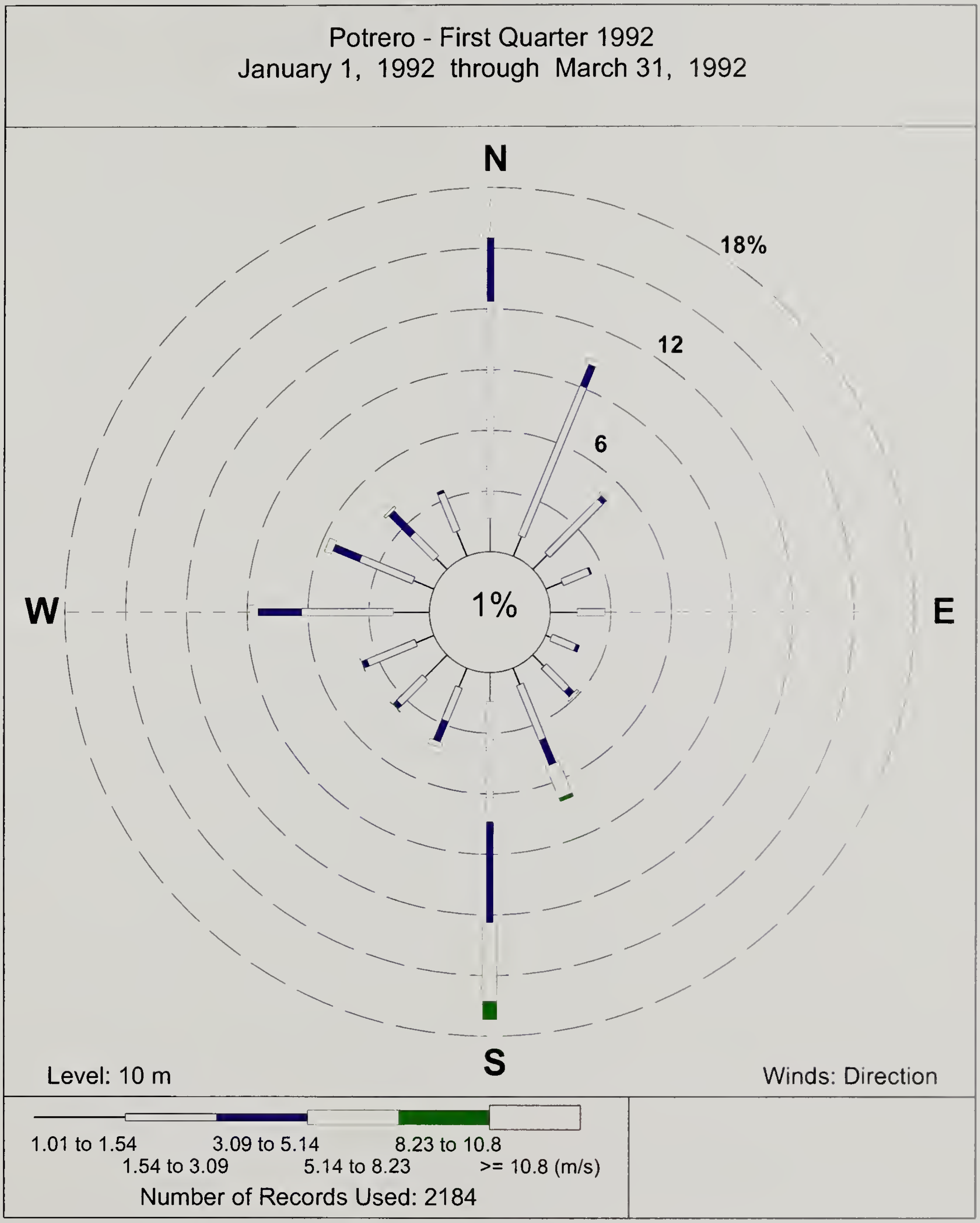


Figure 8.1-5c
Quarterly Wind Rose,
Second Quarter 1992

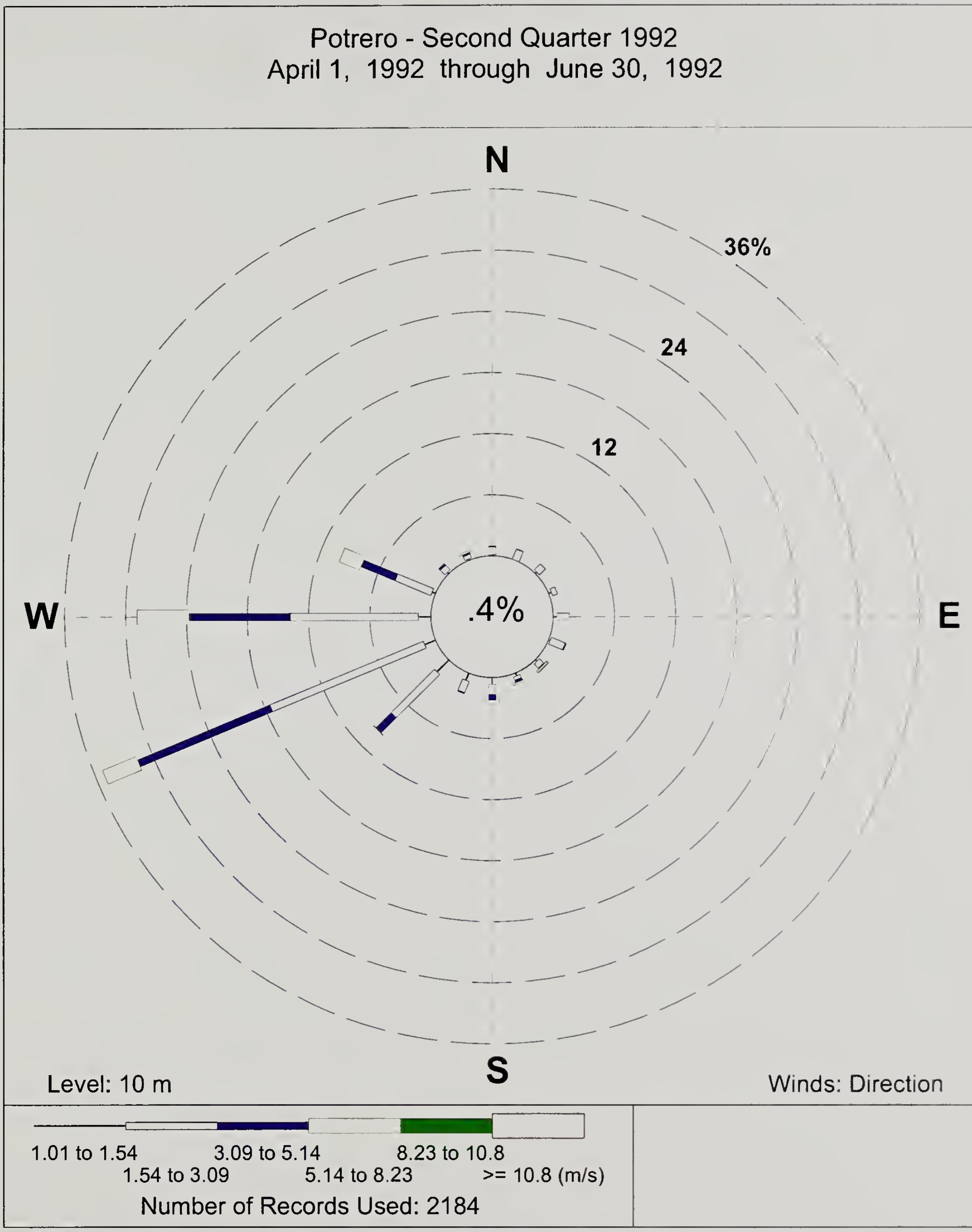


Figure 8.1-5d
Quarterly Wind Rose,
Third Quarter 1992

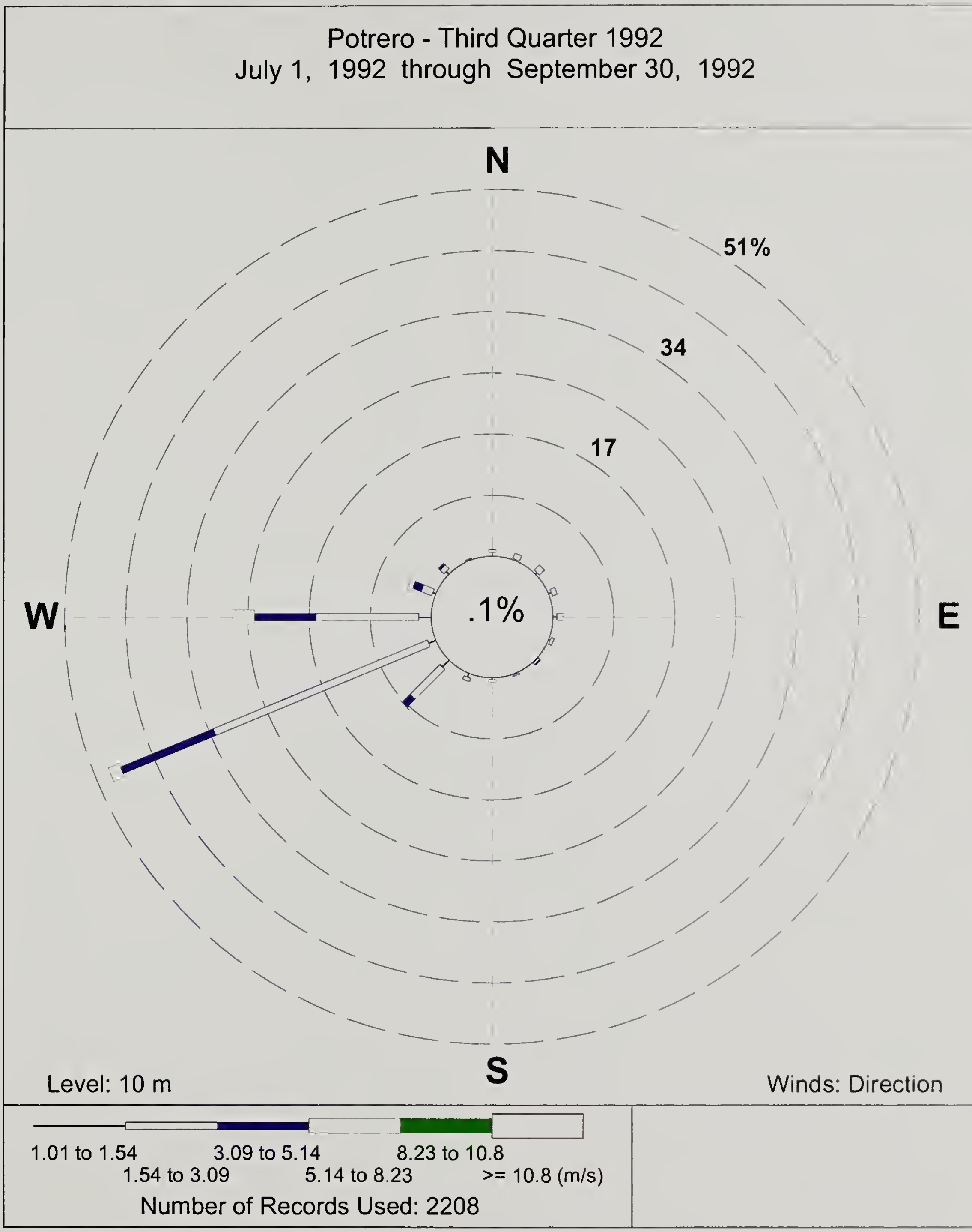


Figure 8.1-5e
Quarterly Wind Rose,
Fourth Quarter 1992

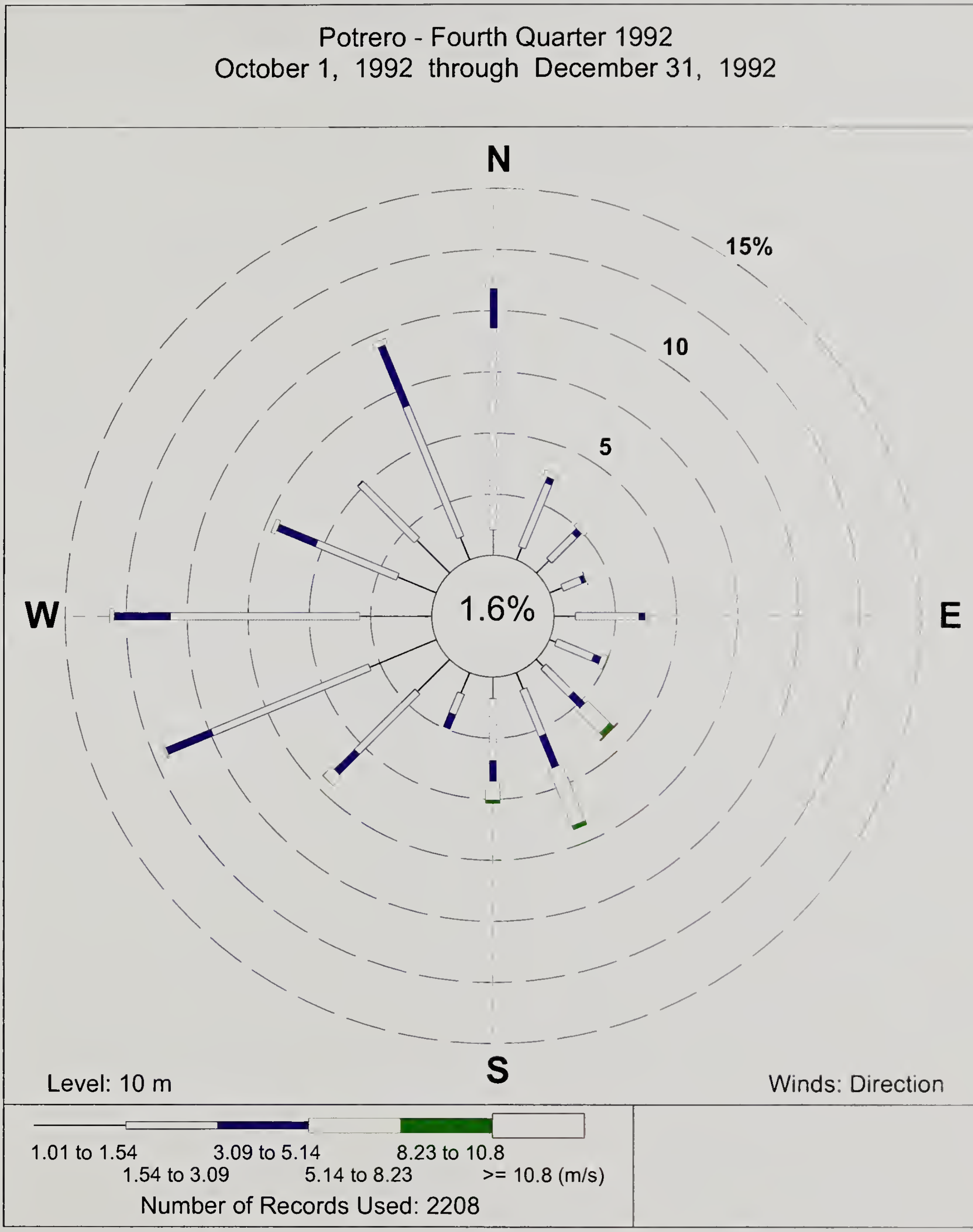


Figure 8.1-6

Maximum Hourly Ozone Levels
San Francisco, 1994-2003

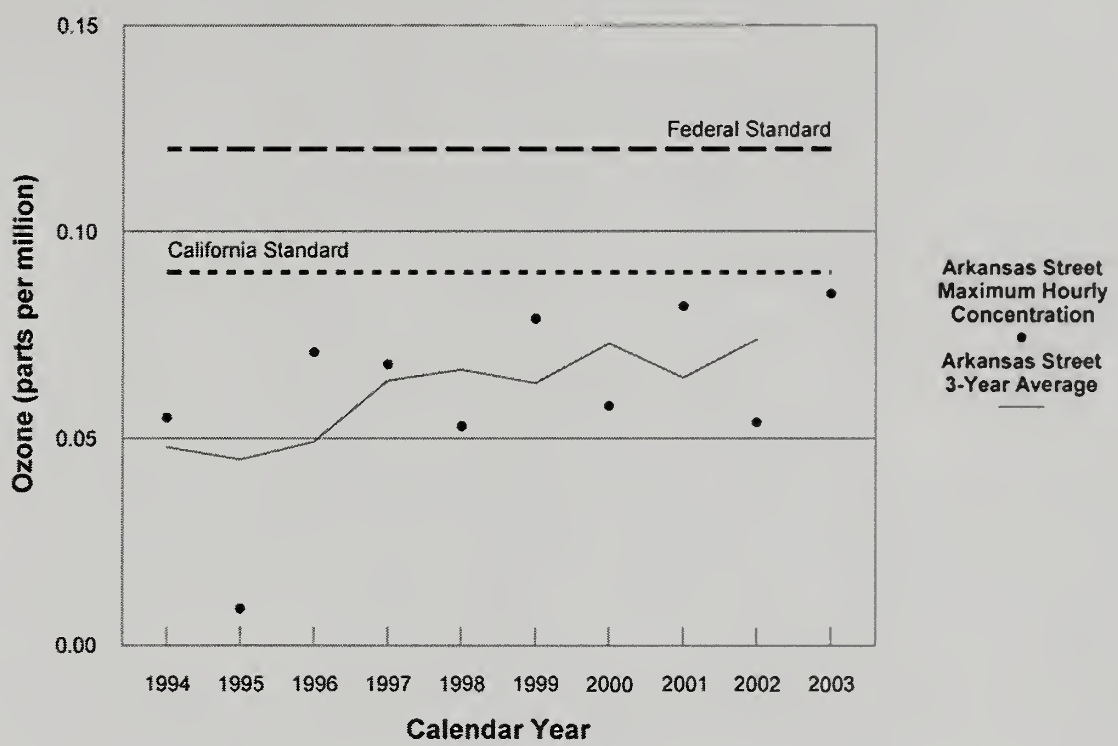


Figure 8.1-7

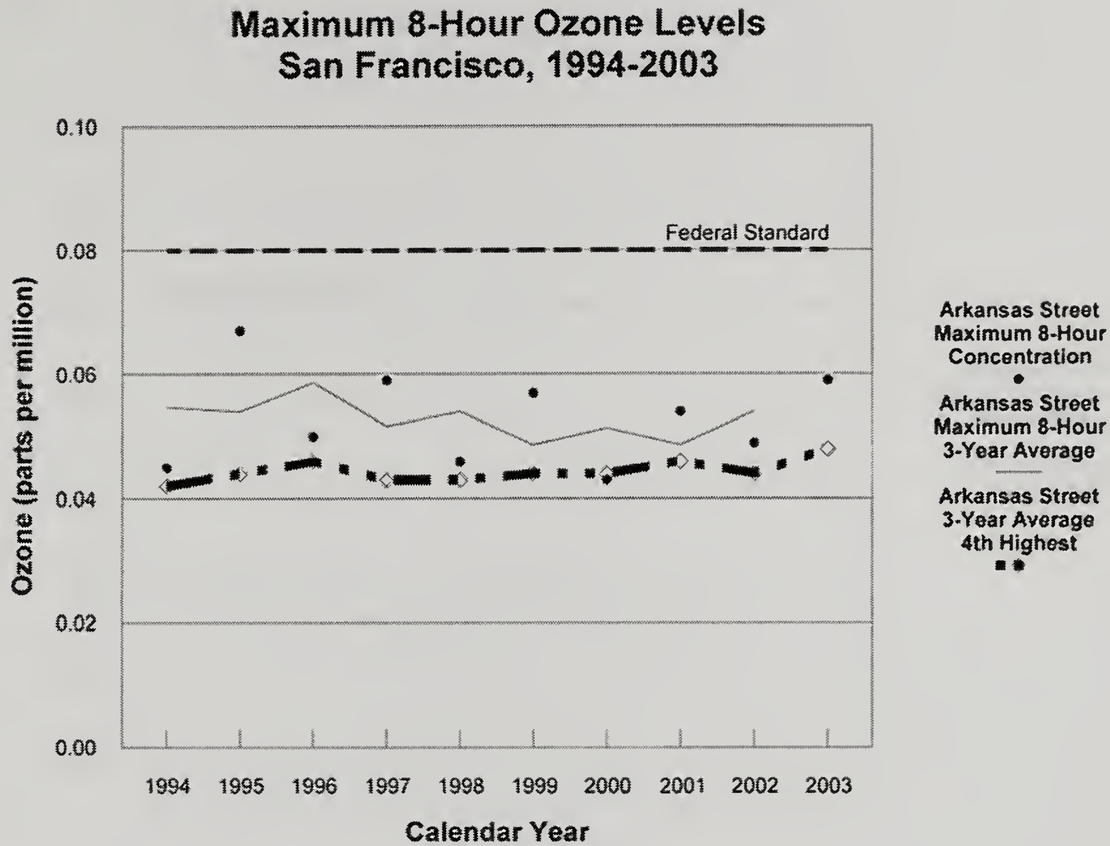

Maximum 8-Hour Ozone Levels
San Francisco, 1994-2003
0.10
0.08
0.06
0.04
0.02
0.00
Federal Standard
Ozone (parts per million)
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Arkansas Street
Maximum 8-Hour
Concentration
Arkansas Street
Maximum 8-Hour
3-Year Average
Arkansas Street
3-Year Average
4th Highest

Figure 8.1-8

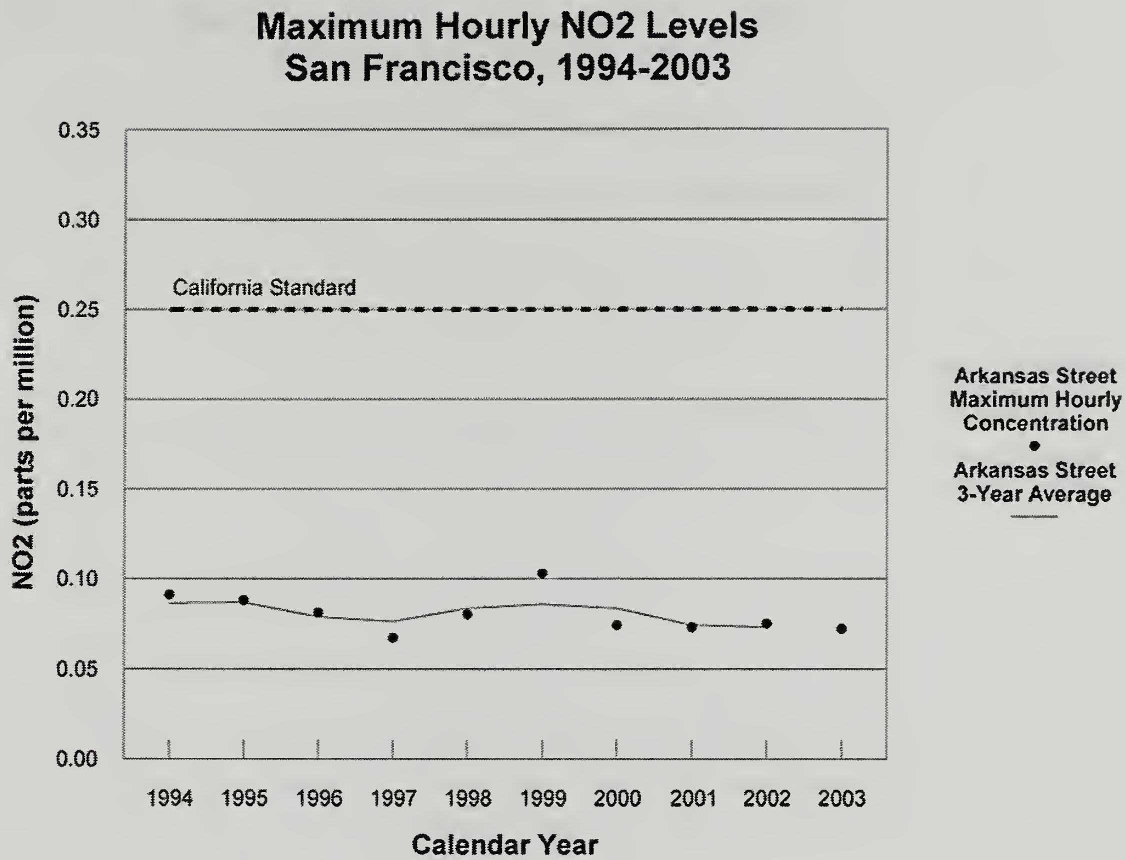

Maximum Hourly NO2 Levels
San Francisco, 1994-2003
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
NO2 (parts per million)
California Standard
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Arkansas Street
Maximum Hourly
Concentration
Arkansas Street
3-Year Average

Figure 8.1-9

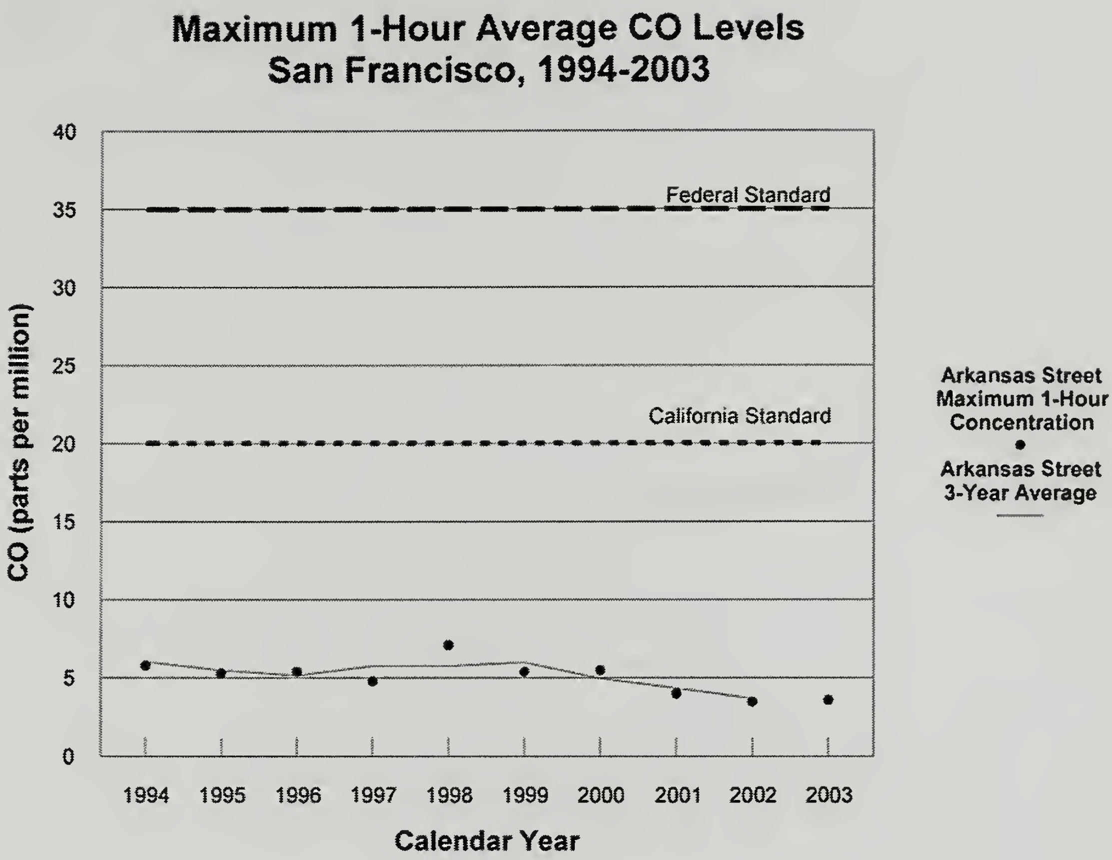

Maximum 1-Hour Average CO Levels
San Francisco, 1994-2003
Federal Standard
California Standard
CO (parts per million)
40
35
30
25
20
15
10
5
0
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Arkansas Street Maximum 1-Hour Concentration
Arkansas Street 3-Year Average

Figure 8.1-10

Maximum 8-Hour Average CO Levels
San Francisco, 1994-2003

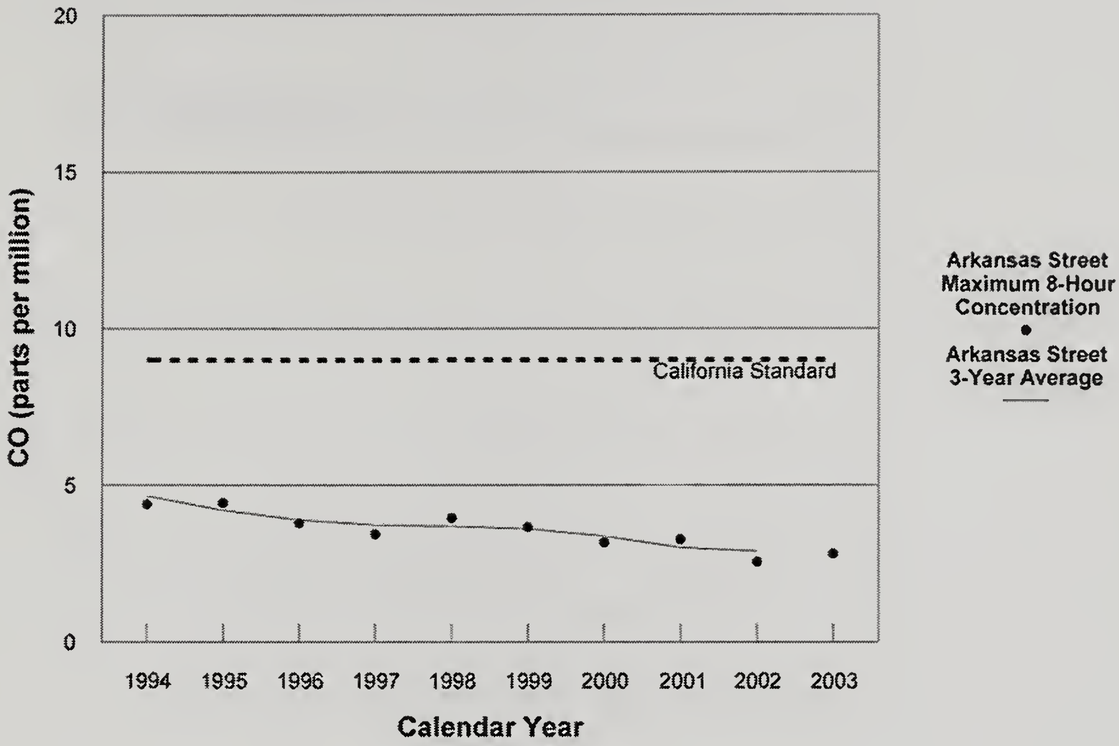


Figure 8.1-11

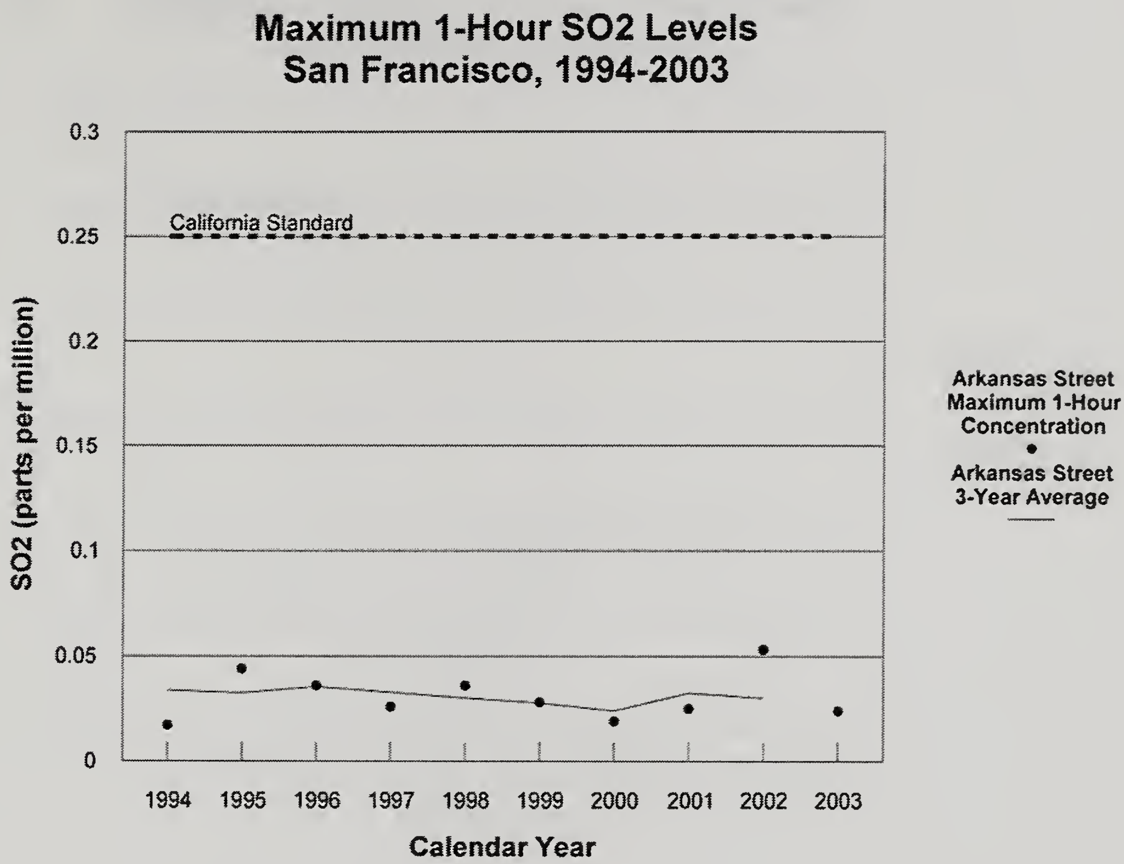

Maximum 1-Hour SO2 Levels
San Francisco, 1994-2003
0.3
0.25
0.2
0.15
0.1
0.05
0
California Standard
SO2 (parts per million)
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Arkansas Street
Maximum 1-Hour
Concentration
Arkansas Street
3-Year Average

Figure 8.1-12

Maximum 24-Hour Average Sulfate Levels San Francisco, 1994-2003

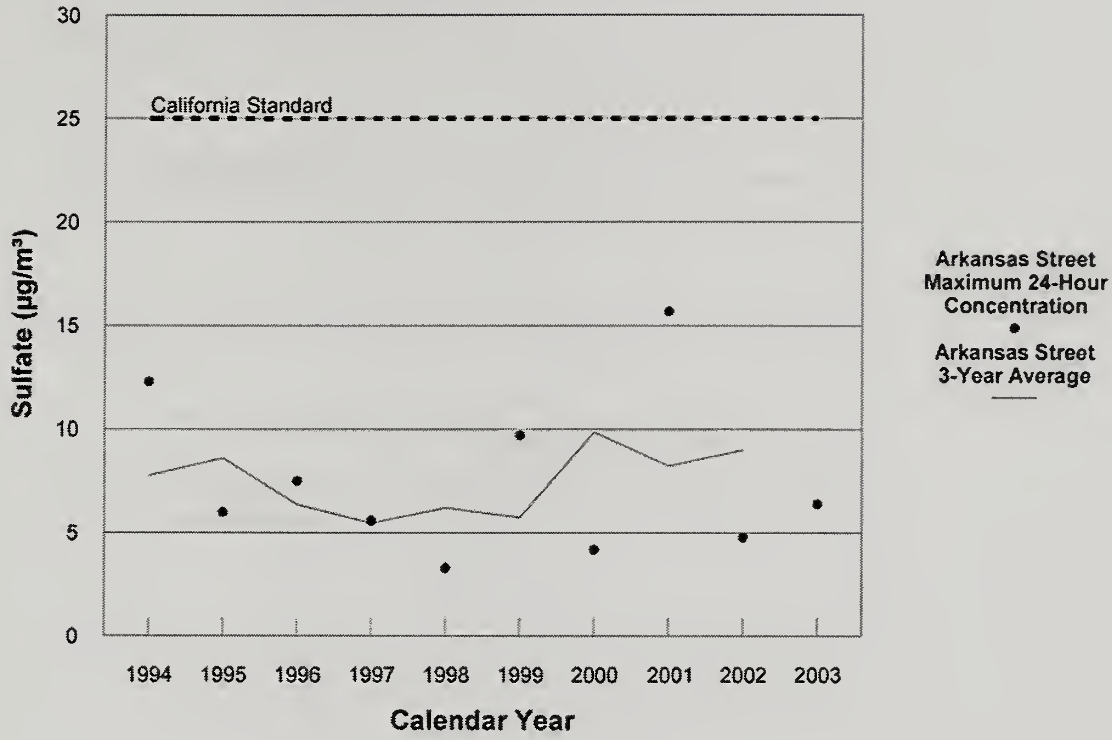


Figure 8.1-13

Maximum 24-Hour Average PM10 Levels San Francisco, 1994-2003

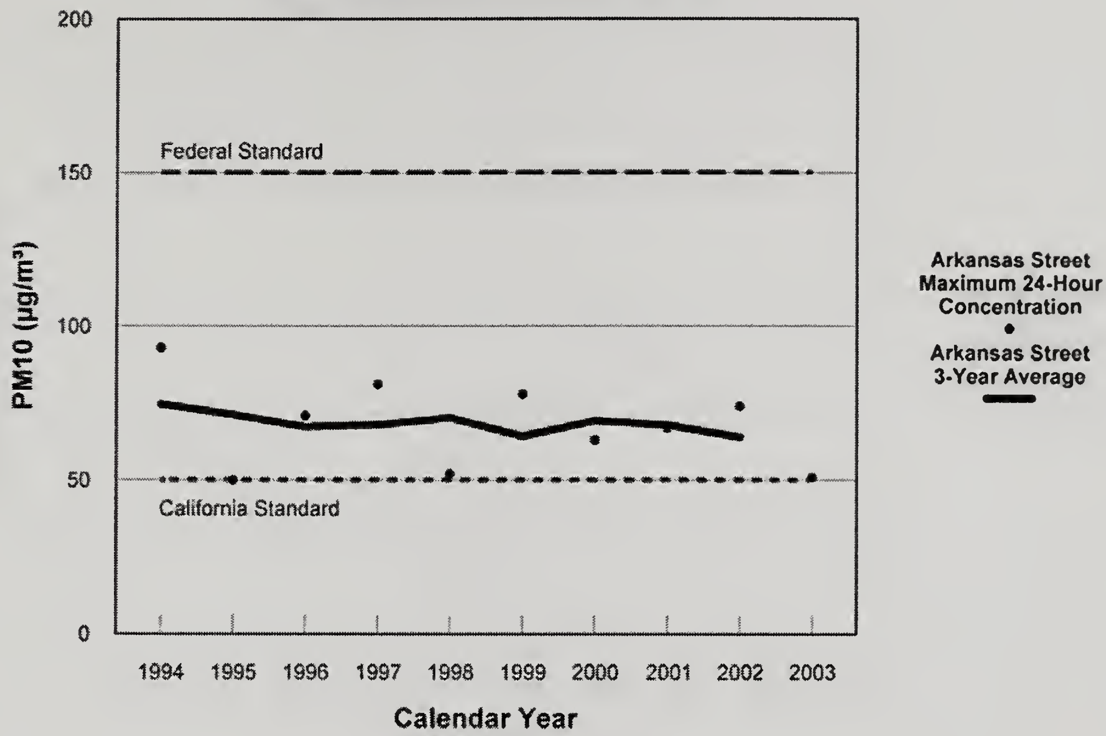


Figure 8.1-14

Expected Violations of the California 24-Hour PM10 Standard (50 µg/m³) San Francisco, 1994-2003

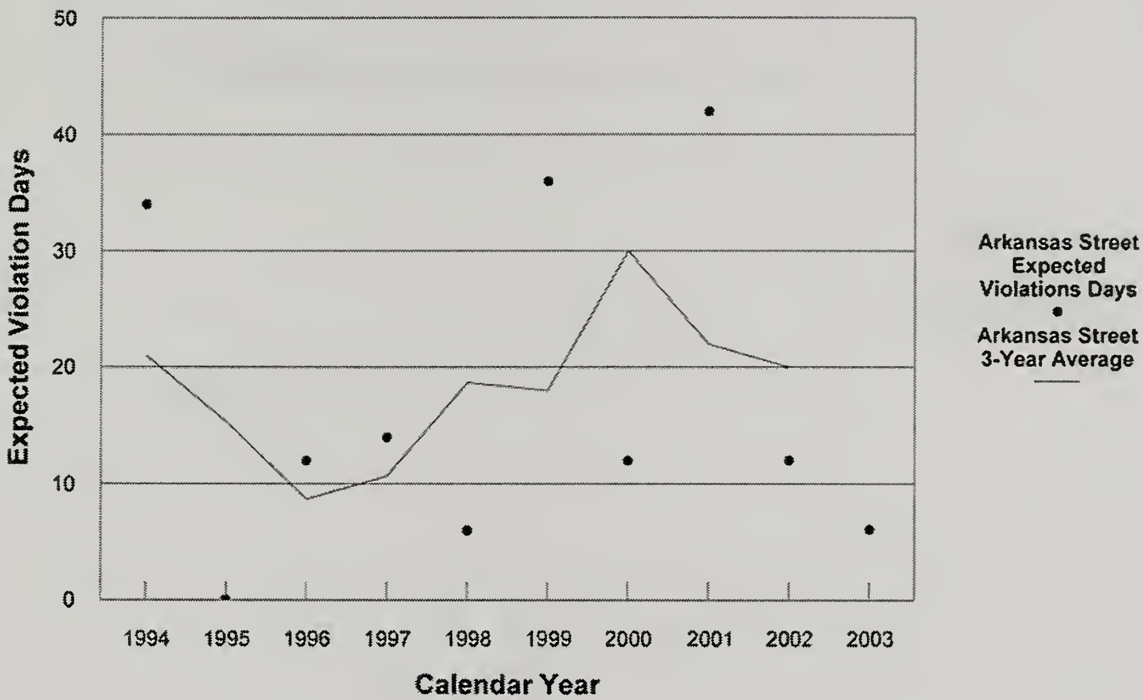
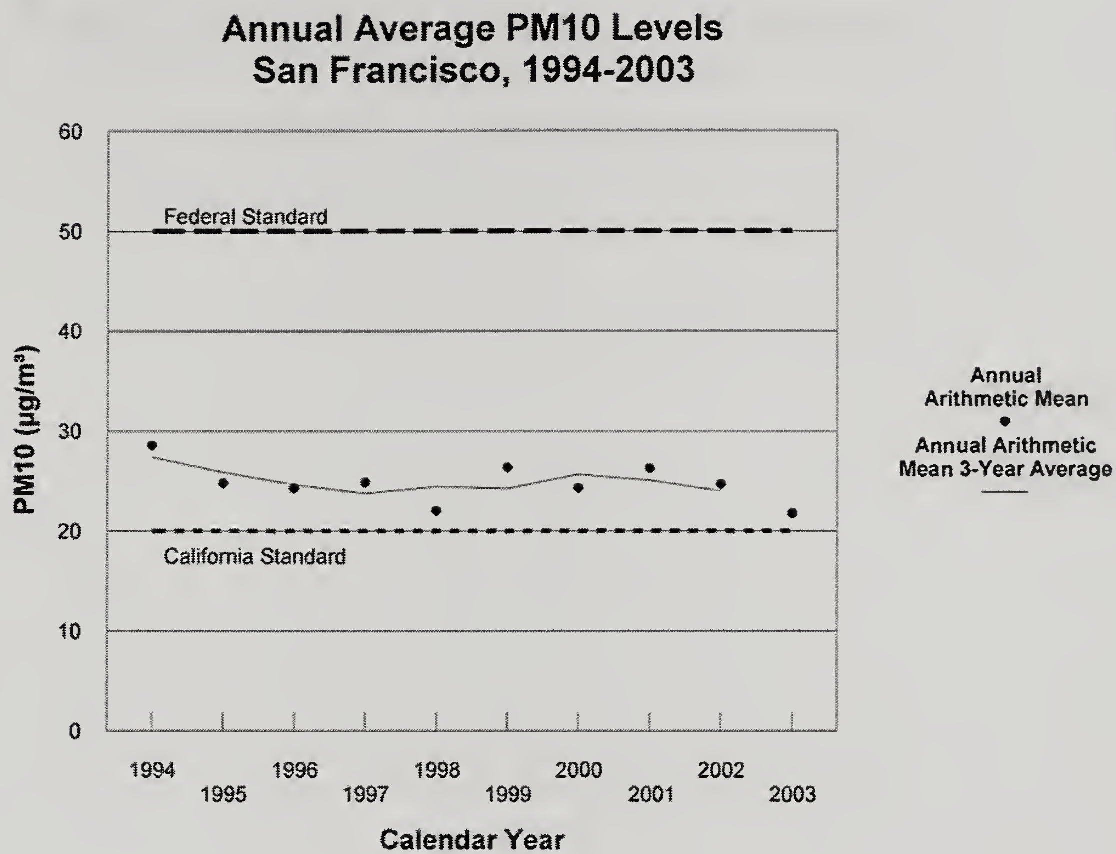
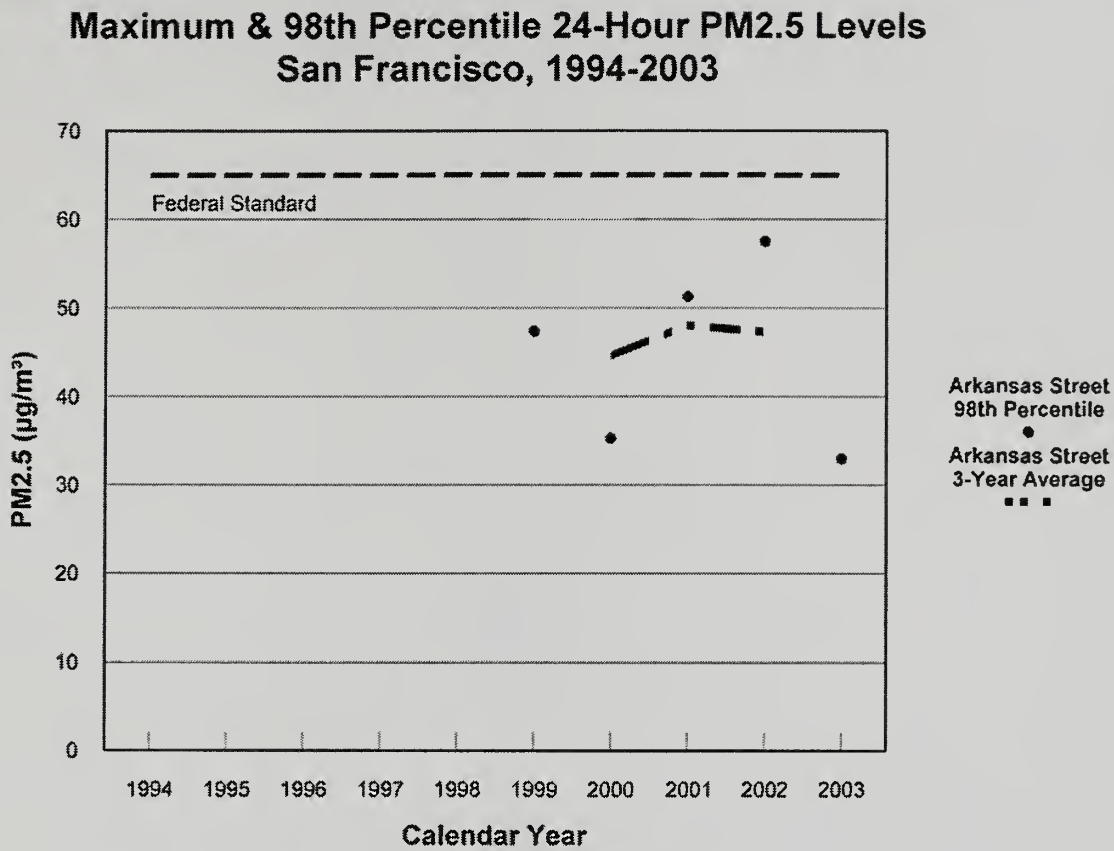


Figure 8.1-15



Annual Average PM10 Levels
San Francisco, 1994-2003
60
50
40
30
20
10
0
Federal Standard
California Standard
PM10 (µg/m³)
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Annual
Arithmetic Mean
Annual Arithmetic
Mean 3-Year Average

Figure 8.1-16


Maximum & 98th Percentile 24-Hour PM2.5 Levels
San Francisco, 1994-2003
70
60
50
40
30
20
10
0
PM2.5 (µg/m³)
Federal Standard
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
Calendar Year
Arkansas Street
98th Percentile
Arkansas Street
3-Year Average

SUBSECTION 8.2

Biological Resources

8.2 Biological Resources

8.2.1 Introduction

This subsection describes the laws, ordinances, regulations, and standards (LORS) that apply to biological resource protection, the environmental setting and conditions of the affected site, the methods that were used to evaluate the potential presence of special-status species, and the potential adverse impacts on biological resources that could occur as a result of project construction and operation. It also presents protection and mitigation measures that would avoid, minimize, or compensate for adverse impacts.

8.2.2 Applicable Laws, Ordinances, Regulations, and Standards

The following subsections describe the primary LORS that apply to potential impacts on biological resources in the project area, and list the agencies responsible for enforcing the regulations. A summary of the LORS is provided in Table 8.2-1, at the end of this section.

8.2.2.1 Federal

Federal Endangered Species Act (FESA, 16 United States Code [USC] 153 et seq.). Applicants for projects that could result in adverse impacts on any federally listed species are required to consult with and mitigate potential impacts in consultation with the U.S. Fish and Wildlife Service (USFWS). Adverse impacts are defined as "take," which is prohibited except through authorization of a Section 7 or Section 10 consultation and Incidental Take Authorization. "Take" under federal definition includes "such act as may include significant habitat modification or degradation" (50 Code of Federal Regulations [CFR] §17.3). Species that are not listed are not protected by the Federal Endangered Species Act (FESA) even if they are candidates for listing; however, USFWS advises that a candidate species (as well as species of concern) could be elevated to listed status at any time, and therefore, applicants should regard these species with special consideration.

Migratory Bird Treaty Act (16 USC 703 to 711) protects all migratory birds, including nests and eggs.

Bald and Golden Eagle Protection Act (16 USC 668) specifically protects bald and golden eagles from harm or trade in parts of these species.

8.2.2.2 State

California Endangered Species Act (Fish and Game Code Section 2050 et seq.). Species listed under this act cannot be "taken" or harmed, except under specific permit. At present, "take" means to do or attempt to do the following: hunt, pursue, catch, capture, or kill.

Fish and Game Code Section 3511 describes bird species, primarily raptors, that are "fully protected." Fully protected birds may not be taken or possessed, except under specific permit requirements.

Fish and Game Code Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

Fish and Game Code Section 3503.5 protects all birds of prey and their eggs and nests.

Fish and Game Code Section 3513 makes it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.

Fish and Game Code Sections 4700, 5050, and 5515 lists mammal, amphibian, and reptile species that are fully protected in California.

Fish and Game Code Sections 1900 et seq., the Native Plant Protection Act lists threatened, endangered, and rare plants listed by the state.

Title 14, California Code of Regulations, Sections 670.2 and 670.5 lists animals designated as threatened or endangered in California. California species of special concern (CSC) is a category conferred by the California Department of Fish and Game (CDFG) on those species that are indicators of regional habitat changes or are considered potential future protected species. CSCs do not have any special legal status, but are intended by CDFG for use as a management tool to take these species into special consideration when decisions are made concerning the future of any land parcel.

California Fish and Game Code (Sections 1601 through 1607) prohibits alteration of any stream, including intermittent and seasonal channels and many artificial channels, without a permit from CDFG. CDFG jurisdiction is limited to areas within the 100-year floodplain. Within this zone, CDFG jurisdiction is subject to the judgment of the department. This applies to any channel modifications that would be required to meet drainage, transportation, or flood control objectives of a project.

California Environmental Quality Act (CEQA) (Public Resources Code Section 15380) defines "rare" in a broader sense than the definitions of threatened, endangered, or species of special concern. Under this definition, CDFG can request additional consideration of species not otherwise protected. CEQA requires that the effects of a project on environmental resources must be analyzed and assessed using criteria determined by the lead agency.

Warren Alquist Act (Public Resources Code Section 25000, et seq.) is a CEQA-equivalent process implemented by the California Energy Commission (CEC). Preparation of this application will result in an assessment prepared by the CEC staff to fulfill the requirements of CEQA.

San Francisco Bay Conservation and Development Commission (BCDC) Permit is required for projects within 100 feet of open water, marshes and mudflats of the San Francisco Bay shoreline in Alameda; Contra Costa; Marin; Napa; San Francisco; San Mateo; Santa Clara; Solano; and Sonoma counties. BCDC jurisdiction also applies to portions of the Suisun Marsh system; ponds, refuges, preserves, and managed wetlands that have been diked off from the Bay, and portions of most creeks, rivers, sloughs, and other tributaries that flow into the San Francisco Bay.

8.2.2.3 Local and Other Jurisdictions

8.2.2.3.1 Applicable Habitat Conservation Plans and Critical Habitat Designations. The project is not located in or under the jurisdiction of an existing Habitat Conservation Plan.

Although the proposed project disturbance areas do not fall within any designated or proposed critical habitat areas, it is located in the general vicinity of Critical Habitat designated under the FESA for:

- Central Valley fall/late fall-run chinook salmon Evolutionarily Significant Unit (ESU) (*Oncorhynchus tshawytscha*)
- Central California coast coho salmon ESU (*Oncorhynchus kisutch*)
- Winter run chinook salmon ESU (*Oncorhynchus tshawytscha*)
- Steller (northern) sea lion (*Eumetopias jubatus*)

An ESU is a distinctive group of Pacific salmon or steelhead. The designated Critical Habitats for the above three salmon species are associated with aquatic resources, while local sea lion Critical Habitat is limited to offshore island rookeries. No project features or construction access would affect any aquatic or shore habitats.

8.2.2.3.2 San Francisco General Plan. The Environmental Protection Element of the San Francisco General Plan (San Francisco County, 1995) contains objectives to protect air (see Subsection 8.1, Air Quality) and water quality (see Subsection 8.14, Water Resources) and ensure sensible management of natural resources as well as conservation and restoration of open space (see Subsection 8.9, Agriculture and Soils) that have benefits to biological resources. It also contains specific policies and goals for protecting areas of sensitive plant and wildlife habitat and for assuring compatibility between natural areas and development. Environmental protection policies applicable to the project are summarized in Table 8.2-1.

8.2.2.3.3 Sustainability Plan for San Francisco. The San Francisco Sustainability Plan includes objectives to limit loss of biodiversity as well as goals to create a sustainable economy while contributing minimal impact on the natural world (City and County of San Francisco, 1997). Objectives applicable to the project are summarized in Table 8.2-1.

8.2.2.3.4 San Mateo County General Plan. The Vegetative, Water, Fish, and Wildlife Resources Policies chapter of the San Mateo County General Plan (San Mateo County, 1986) contains specific policies and goals for protecting areas of sensitive plant and wildlife habitat and for assuring compatibility between natural areas and development. The policies of this plan are included based on the potential for air emission impacts on serpentine habitat within San Mateo County's San Bruno Mountain State and County Park. Environmental protection policies applicable to the project are summarized in Table 8.2-1.

8.2.3 Environmental Setting

The following subsections describe the biological conditions of the proposed San Francisco Electric Reliability Project (SFERP) site, beginning with a regional overview, the vegetation types and habitat present in the project area, a description of wildlife typical to the area, and a discussion of specific special-status species known to occur in the general region. (See Figure 8.2-1 for documented species locations. Figures are located at the end of this subsection.)

TABLE 8.2-1
Applicable Laws, Ordinances, Regulations, and Standards

Element	Goal/Policy	Conformance
Federal		
Federal Endangered Species Act (FESA, 16 USC 153)	Applicants for projects that could result in adverse impacts on any federally listed species are required to consult with and mitigate potential impacts in consultation with the U.S. Fish and Wildlife Service (USFWS).	The SFERP site does not include habitat for federally listed species. Construction and operation will avoid significant impacts to federally listed species and their habitat.
Migratory Bird Treaty Act (16 USC 703 to 711)	Protects all migratory birds, including nests and eggs.	The SFERP site does not include habitat or other features that would likely attract migratory birds. Stacks will be low in profile and are not likely to result in significant bird strikes. New transmission lines will underground.
Bald and Golden Eagle Protection Act (16 USC 668)	Specifically protects bald and golden eagles from harm or trade in parts of these species.	The SFERP site does not include habitat or other features that would likely attract eagles. Stacks will be low in profile and are not likely to result in significant bird strikes. New transmission lines will be underground.
State		
California Endangered Species Act (Fish and Game Code Section 2050 et seq.).	Species listed under this act cannot be "taken" or harmed, except under specific permit.	The SFERP site was analyzed and it was determined that SFERP construction or operation will not affect listed species and, therefore, not result in "take."
Fish and Game Code Section 3511	Describes bird species, primarily raptors, that are "fully protected." Fully protected birds may not be taken or possessed, except under specific permit requirements.	SFERP construction or operation will not result in "take." Stacks will be low in profile and are not likely to result in significant bird strikes. New transmission lines will be underground.
Fish and Game Code Section 3503	States that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.	The SFERP site was analyzed and does not include features that would encourage or accommodate nest building. Any encountered nests would be avoided during the species' breeding season.

TABLE 8.2-1
Applicable Laws, Ordinances, Regulations, and Standards

Element	Goal/Policy	Conformance
Fish and Game Code Section 3503.5	Protects all birds of prey and their eggs and nests.	The SFERP site was analyzed and does not include habitat or other features that would likely attract birds of prey. Stacks will be low in profile and are not likely to result in significant bird strikes. New transmission lines will be underground. The SFERP site was analyzed and does not include features that would encourage or accommodate nest building.
Fish and Game Code Section 3513	Makes it unlawful to take, possess, or destroy any birds of prey or to take, possess, or destroy the nest or eggs of any such bird.	SFERP construction or operation will not result in “take” of birds of prey, their nests, or eggs. Site features have been designed to avoid avian strikes. The SFERP site does not include features that would encourage or accommodate nest building.
Fish and Game Code Sections 4700, 5050, and 5515	Lists mammal, amphibian, and reptile species that are fully protected in California.	The SFERP site was analyzed and does not include likely habitat for fully protected mammal, amphibian, or reptile species.
Fish and Game Code Sections 1900 et seq.,	The Native Plant Protection Act lists threatened, endangered, and rare plants listed by the state.	The SFERP site was analyzed and does not include likely habitat for protected plant species.
Title 14, California Code of Regulations, Sections 670.2 and 670.5	Lists animals designated as threatened or endangered in California.	The SFERP site was analyzed and does not include likely habitat for state-listed species.
California Fish and Game Code (Sections 1601 through 1607)	Prohibits alteration of any stream, including intermittent and seasonal channels and many artificial channels, without a permit from CDFG.	The SFERP site construction was analyzed and will not include alteration of any stream or channel.
California Environmental Quality Act (CEQA) (Public Resources Code Section 15380)	CEQA requires that the effects of a project on environmental resources must be analyzed and assessed using criteria determined by the lead agency.	The Application for Certification (AFC) analysis and process is CEQA equivalent. All requirements under CEQA are met with the analysis in the SFERP AFC.

TABLE 8.2-1
Applicable Laws, Ordinances, Regulations, and Standards

Element	Goal/Policy	Conformance
Warren Alquist Act (Public Resources Code Section 25000, et seq.)	Warren-Alquist Act is a CEQA-equivalent process implemented by the California Energy Commission (CEC).	The AFC analysis and process is CEQA-equivalent. All requirements under the Warren-Alquist Act are met with the analysis in the SFERP AFC.
San Francisco Bay Conservation and Development Commission (BCDC) Permit	BCDC regulates activities and development with the potential to adversely impact the San Francisco Bay.	A BCDC permit will not be required. The SFERP site and temporary laydown yard are located beyond the 100-foot-from-shoreline BCDC jurisdiction.
Local and Other Jurisdictions		
City and County of San Francisco General Plan		
Environmental Protection	Objective 1. Achieve proper balance among the conservation, utilization, and development of San Francisco's natural resources.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Policy 1.1. Conserve and protect the natural resources of San Francisco. The City and County must assure that its remaining natural resources are protected from misuse. The use of existing resources should provide maximum benefit for public use while preserving and protecting the natural character of the environment.	SFERP is located and designed to avoid biological resources.
Environmental Protection	Policy 1.2. Improve the quality of natural resources. To prevent contamination of natural resources, the City and County should support and comply with all anti-pollution standards of the region.	An erosion and sediment control plan will be prepared.
Environmental Protection	Policy 1.3. Restore and replenish the supply of natural resources. The City and County should undertake projects to acquire or create open space, cultivate more vegetation, replenish wildlife, and landscape man-made surroundings.	SFERP will not result in the removal of open space or native vegetation.
Environmental Protection	Policy 1.4. Assure that all new development meets strict environmental quality standards and recognizes human needs. Development projects should not disrupt natural or ecological balance, degrade the visual character of natural areas, or otherwise conflict with the objectives and polices of the Master Plan.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Objective 3. Maintain and improve the quality of the Bay, ocean, and shoreline areas.	SFERP is located and designed to avoid biological resources. It will not use the Bay as a water source as do other local power plants.
Environmental Protection	Policy 3.3. Implement plans to improve sewage treatment and halt pollution of the Bay and ocean.	SFERP will use recycled water and combined sewer drains.

TABLE 8.2-1
Applicable Laws, Ordinances, Regulations, and Standards

Element	Goal/Policy	Conformance
Environmental Protection	Objective 8. Ensure the protection of plant and animal life in the City.	SFERP is located and designed to avoid biological resources.
Environmental Protection	Policy 8.1. Cooperate with and otherwise support the CDFG and its animal protection programs.	SFERP is located and designed to avoid biological resources.
Environmental Protection	Policy 8.2. Protect the habitats of known plant and animal species that require a relatively natural environment. Primarily encourages the continued management of established open areas like Golden Gate Park, beaches, the Presidio, and other areas with open space that provide potential natural habitat for plant and wildlife species.	SFERP is located and designed to avoid impacts to biological resources.
Environmental Protection	Policy 8.3. Protect rare and endangered species.	SFERP is located and designed to avoid impacts to biological resources.
Recreation and Open Space	Objective 1. Preserve large areas of open space sufficient to meet long-range needs of the bay region. This primary objective of this element is to preserve and promote the use of open space for recreation. This includes conservation of natural habitat.	SFERP is located and designed to avoid impacts to biological resources. The project will not involve the removal of open space.
Recreation and Open Space	Policy 2.13. Preserve and protect significant natural resource areas. The City and County should make efforts to preserve remaining open spaces that provide habitat for plant and wildlife species.	The project site is not characterized by unique natural features or open space that provides significant habitat for plant or wildlife species.
The Sustainability Plan for the City of San Francisco		
Biodiversity	Goal 2. To protect and restore remnant natural ecosystems	SFERP is located and designed to avoid impacts to biological resources.
Biodiversity	Goal 3. To protect sensitive species and their habitats and support their recovery in San Francisco.	SFERP is located and designed to avoid impacts to biological resources.
Biodiversity	Goal 4. To maximize habitat value in developed and naturalistic areas, both public and private.	Not applicable. Project is in an industrial area.
San Mateo County General Plan		
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.2. The County will protect sensitive habitats from reduction in size or degradation of the conditions necessary for their maintenance.	SFERP is located and designed to avoid impacts to biological resources from nitrogen deposition.
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.23. The County will regulate the location, density and design of development to minimize significant adverse impacts and encourage enhancement of vegetative, water, fish and wildlife resources.	SFERP is located and designed to avoid impacts to biological resources from nitrogen deposition.

TABLE 8.2-1
Applicable Laws, Ordinances, Regulations, and Standards

Element	Goal/Policy	Conformance
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.26. The County will ensure that development will minimize disruption of fish and wildlife and their habitats.	SFERP is located and designed to avoid impacts to biological resources from nitrogen deposition.
Vegetative, Water, Fish and Wildlife Resources Policies	Policy 1.27. The County will regulate land uses and development activities within and adjacent to sensitive habitats in order to protect critical vegetative, water, fish, and wildlife resources; protect rare, endangered, and unique plants and animals from reduction in their range or degradation of their environment; and protect and maintain the biological productivity of important plant and animal habitats.	SFERP is located and designed to avoid impacts to biological resources from nitrogen deposition.

Sources: City and County of San Francisco (1995), City of San Francisco (1997), and San Mateo County (1986).

8.2.3.1 Regional Overview

The proposed SFERP site is located near the western shore of central San Francisco Bay (Bay) in the Potrero District of San Francisco (see Figures 8.2-1 and 8.2-2).

The San Francisco Bay is a breach in the Coast Range that extends for much of the length of the state. The Bay is an important geologic break in the range, providing an influential climatic and hydrological connection between the Pacific Ocean and the Central Valley. The San Francisco area abounds with environmental diversity as land meets water and salt water meets fresh water. The result is a collection of communities such as deep open water, sandy shorelines, dunes, oak woodlands, grasslands, scrub, salt flats, salt marshes, estuaries, brackish marshes, freshwater marshes, and riparian corridors. The range of habitats and transition zones between these communities results in a diverse assemblage of plant and wildlife species.

San Francisco itself is approximately a 7-mile square peninsula defining the northern end of the south Coast Range. It is urban with dense industrial, commercial, and residential development. However, it is not without undeveloped or abandoned lots, parkland, and other patches of designated open space providing important habitat for common and special-status plant and wildlife species. Even in the urban landscape, many species have adapted and continue to persist in the presence of human disturbance and significant habitat modification.

The SFERP site is located in a heavily industrialized area of San Francisco. The plant site has been cleared of permanent structures and is currently occupied by a temporary cement batch plant. The existing Potrero Power Plant (Potrero PP) is approximately 0.3 miles to the north. The approximately 8.5-acre proposed laydown area is immediately east of the site, on Port of San Francisco land (see Figure 8.2-2). This area is currently being used for equipment storage and separates the SFERP site from the Bay. Industrial and commercial land uses are immediately adjacent to all site boundaries. Aquatic habitats of the Bay are approximately 180 feet northeast of the site and 120 feet from the temporary laydown yard. The associated SFERP underground electrical transmission, gas, and water lines will be located along or in roadways; are entirely within commercial and industrial areas; will involve local (less than 0.76 mile) connections with existing infrastructure, and will not affect biological resources. Significant biological resources in the project vicinity include the San Francisco Bay, Heron's Head Park, and San Bruno Mountain (see Figures 8.2-1 and 8.2-2). The San Francisco Bay is an inlet where the inland waters from the Sacramento and San Joaquin rivers meet the Pacific Ocean. The Bay provides important habitat for fish, migratory birds, and wetland plant and wildlife species. Heron's Head Park is located approximately 1 mile south of the project and adjacent to the Hunter's Point power plant. The 24-acre park is a restored wetland situated on top of a landfill. San Bruno Mountain State and County Park is located approximately 4 miles southwest of the project in San Mateo County, east of Daly City. The biological resources of this park are the subject of the San Bruno Mountain Habitat Conservation Plan. Islais Creek is located approximately 990 feet directly south of the proposed SFERP site. It is one of the few creeks located in the city of San Francisco and is tidally influenced. It once emptied into a large marsh that emptied into the Bay but has been channelized and severely modified with riprap. The marsh no longer exists and Islais Creek is now used for activities associated with the port. Figure 8.2-2 includes project feature locations and biological resources identified on aerial photos at 1:13,200 scale.

The ocean influence and varied topography surrounding San Francisco result in a variety of microclimates. The geographical break in the Coastal Range channels wind through the Bay and influences climate east through the Central Valley and up the Sierra Nevada Range. San Francisco experiences a typical Californian Mediterranean climate, modified by its ocean proximity. True to the Mediterranean climate, winters are characteristically mild (45 to 60 degrees Fahrenheit [°F]) and moist. However, wind patterns and cold ocean water combine to produce fog and moderate summer temperatures (50°F to 70°F).

The following subsections describe the types of habitat found in the project impact areas. Special-status species that are known or have the potential to occur in the project impact areas are listed in Table 8.2-2 (located at the end of this subsection) and described in Subsection 8.2.3.3. A comprehensive list of special-status species obtained from USFWS, CDFG, and the CEC's Final Staff Assessment (FSA) for the proposed Potrero PP Unit 7 (PPPU7) (CEC, 2002) that was used to evaluate project impacts to sensitive biological resources is included in Appendix 8.2A.

8.2.3.2 Habitat and Vegetation Communities

The SFERP site is located entirely within a previous industrial development and includes areas of hard-packed, unvegetated gravel and dirt, non-native grasses and forbs, and an active concrete batch plant. There are no remaining features that provide significant natural habitat for plant or wildlife species. Vegetation is primarily limited to nonnative invasive species that have become established in small patches of less disturbed bare ground. These areas provide limited forage and cover resources for a limited diversity of wildlife such as common passerines and rodents. The associated linear features are contained within a combination of pavement and hard-pack gravel roads and concrete sidewalks. The laydown yard is a well used storage area characterized by hard-packed gravel and dirt, with a paved perimeter. The north and northeastern boundaries of the laydown are approximately 120 feet from the Bay (see Figure 8.2-2). The adjacent shoreline is armored with riprap and the upper bank includes sparse vegetation such as fennel, pampas grass, and non-native grasses and forbs. This area is outside of the laydown area and provides limited forage and cover for common bird and other wildlife species. San Francisco Bay is the closest area of significant habitat to the SFERP site. The Bay shore has been significantly modified with piers, bulkheads, rip rap, and stabilizing structures. The waterfront is developed for shipping and commercial uses.

8.2.3.3 Special-Status Species

A list of federal and state special-status plant and wildlife species was compiled for the project area based upon the following references: the CDFG California Natural Diversity Database (CNDDB); California Native Plant Society's (CNPS) Electronic Inventory; a USFWS species list requested for San Francisco County; the PPPU7 FSA; and a field reconnaissance survey. The reference information is based on known occurrences, historical records, or the presence of suitable habitat for any given life stage of a particular species. The known locations of special-status species identified in the CNDDB records for the associated Point Bonita, San Francisco North, Oakland West, Hunters Point U.S. Geological Survey (USGS) quadrangles are shown on Figure 8.2-1. The field reconnaissance survey was performed by a CH2M HILL biologist on February 11, 2005, and included a 1-mile radius around the site. Based on the project setting, it was determined that focused or additional

surveys would not be necessary as no significant biological resources would be affected by construction or operation. The qualifications of the field biologist are provided in Appendix 8.2B.

The reference search and survey resulted in the comprehensive special-status species list provided in Appendix 8.2A. The list includes species listed as threatened or endangered that have special requirements under the FESA and California Endangered Species Acts (CESA) and other unlisted special-status species that could become listed in the future. The table includes the habitat types that could support these species as well as the potential for occurrence in the project area.

Results from the reconnaissance survey, habitat evaluations, aerial photographs, and the FSA for the nearby PPPU7 project conclude an absence of significant biological resources in the SFERP project area. There are no property or project features that would support special-status plants or attract special-status wildlife. Potential impacts are limited to avian collision with exhaust stacks. This impact would be a function of plant operation rather than construction.

The San Francisco Bay area includes sensitive serpentine habitats that are adversely impacted by significant levels of NO_x deposition. Due to prevailing winds, SFERP operation is not expected to contribute significant NO_x deposition on surrounding serpentine habitats such as those found on San Bruno Mountain.

Therefore, the initial species list was shortened to include only those species that may be affected by these two potential impact sources. The abbreviated list is presented in Table 8.2-2.

8.2.3.3.1 Special-Status Plants. Information acquired from the CNDDB, CNPS, and other sources resulted in a list of 33 special-status plants species that could occur in San Francisco County (Appendix 8.2A). Most of these species are associated with natural habitats that were once prevalent in San Francisco but have since been lost to extensive urban development. Vegetation in the project area is limited to invasive species established in less frequented patches of disturbed ground. Therefore, project construction will not result in direct removal of special-status plant species. No trees are located on the site.

The greatest potential for impact to plants would be from nitrogen deposition due to NO_x emissions during facility operation. Nitrogen functions as a vegetation fertilizer when added to grassland and woodland communities such as are found on San Bruno Mountain. Those San Bruno Mountain habitats on serpentine rock are characteristically nutrient deficient and support relatively low plant species diversity. Those plants that are adapted to withstand serpentine soils are often rare and endemic. The addition of nitrogen could promote plant species that otherwise find serpentine habitat inhospitable. This potentially results in increased competition and loss of habitat for more serpentine habitat-dependent plant species. However, due to prevailing winds, SFERP operation is not expected to contribute significant NO_x deposition on surrounding serpentine habitats such as those found on San Bruno Mountain.

The initial special-status plant species list was shortened to eight species based on their association with serpentine habitat (Table 8.2-2). This includes shrubs such as the Presidio

manzanita (*Arctostaphylos hookeri* ssp. *franciscana*) and annual herbs such as San Francisco owl's clover (*Orthocarpus floribundus*).

8.2.3.3.2 Special-Status Wildlife. Information acquired from the CNDDB, USFWS, and other sources resulted in a list of 79 special-status wildlife species whose occurrence has been previously recorded in San Francisco County (County) (Appendix 8.2A). Because of the lack of suitable habitats, it is unlikely that any of these species would be found in the project area. Impacts to aquatic resources and the species associated with those habitats were the primary concern for the proposed PPPU7. Unlike that project, the SFERP water supply does not include direct intake or discharge of San Francisco Bay water. SFERP water will be supplied and discharged by conventional City of San Francisco (City) infrastructure. The project site presents no significant resources to attract terrestrial wildlife. Therefore, the initial species list was abbreviated to include only those species that may be affected by nitrogen deposition and avian collision.

Five special-status insects depend on nectar sources associated with serpentine habitats such as those on San Bruno Mountain. Those species include San Bruno elfin butterfly (*Incisalia mossii bayensis*), mission blue butterfly (*Icaricia icarioides missionensis*), callippe silverspot butterfly (*Speyeria callippe callippe*), Bay checkerspot butterfly (*Euphydryas editha bayensis*), and Opler's longhorn moth (*Adela oplerella*). However, because of prevailing winds, SFERP operation is not expected to contribute significant NO_x deposition on surrounding serpentine habitats such as those found on San Bruno Mountain (see subsection 8.2.4.2.5).

Exhaust stacks represent collision potential for various bird species. Thirty bird species were included in the abbreviated special-status species list. These species may risk collision when migrating through the general area or when traveling between resource areas. These include raptors such as Cooper's hawk (*Accipiter cooperii*) and American peregrine falcon (*Falco peregrinus anatum*); coastal birds such as California brown pelican (*Pelecanus occidentalis californicus*) and double-crested cormorant (*Phalacrocorax auritus*); and passerines such as rufus hummingbird (*Selasphorus rufus*) and saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*).

8.2.3.4 Biological Surveys

A biological reconnaissance survey of the project area and general vicinity was performed by a biologist from CH2M HILL on February 11, 2005. The surveyor's qualifications are provided in Appendix 8.2B. The field surveys were aided by aerial photographs, which helped identify land uses. The presence, or potential presence, of sensitive biological resources was determined from information gathered during field surveys conducted for the project, published and unpublished literature, and natural resource agency databases. The survey included the site and an area within a 1-mile radius from the site (see Figure 8.2-2). Results from 1999 and 2000 surveys performed for the proposed PPPU7 were also used for reference (Mirant, 2000). No further biological surveys are considered necessary. A list of species observed in the project vicinity is included in Table 8.2-3.

TABLE 8.2-3
Wildlife Species Observed During the Biological Reconnaissance Visit of the SERP Project Area (February 11, 2005)

Common Name	Scientific Name	Location	Sign
BIRDS			
Western grebe	*Aechmophorus occidentalis*	San Francisco Bay	Observation
Double-crested cormorant	*Phalacrocorax auritus*	San Francisco Bay	Observation
Great egret	*Ardea alba*	San Francisco Bay	Observation
Canada goose	*Branta Canadensis*	Adjacent open field to the west of the proposed site	Observation
American wigeon	*Anas Americana*	San Francisco Bay	Observation
Greater scaup	*Aythya marila*	San Francisco Bay	Observation
Bufflehead	*Bucephala albeola*	San Francisco Bay	Observation
Western sandpiper	*Calidris mauri*	San Francisco Bay	Observation
Western gull	*Larus occidentalis*	San Francisco Bay	Observation
Rock dove	*Columba livia*	Proposed site, laydown area, and adjacent upland areas	Observation
European starling	*Sturnus vulgaris*	Proposed site, laydown area, and adjacent upland areas	Observation
White-crowned sparrow	*Zonotrichia leucophrys*	Perimeter of proposed laydown yard	Observation
MAMMALS			
Domestic dog	*Canis familiaris*	Proposed site, laydown area, and adjacent upland areas	Tracks

8.2.4 Environmental Consequences

Potential direct and indirect impacts to biological resources were evaluated to determine the permanent and temporary effects of the construction, operation, maintenance, and decommissioning of the SFERP project and supporting facilities. A summary of potential project impacts is presented in Table 8.2-4.

TABLE 8.2-4
Summary of Permanent and Temporary SFERP Project Impacts on Biological Resources During Construction.

Location	Project Work	Construction Zone Size	Time Requirements	Habitat Type	Sensitive Biological Resources	Impacts	
						Temporary	Permanent
Power plant site	Removal of existing temporary structures and grading for footprint construction	4 acres	Start 2nd Quarter 2006	Gravel and ruderal hard packed dirt	None	None	Development of 4 acres of previously developed land
Construction laydown area	Construct compacted gravel pad or use existing surface	8.5 acres	Start 2nd Quarter 2006	Gravel and hard packed dirt	None	8.5 acres	None
Natural gas pipeline	Open pipeline trench to local tie-in location	Approximately 900-foot-long line will tie in with the existing PG&E San Francisco Line 101 located at the corner of Illinois and 25th streets.	Start 4th Quarter 2006	Paved	None	None	None
Potable water supply line	Open pipeline trench to local tie-in location	A 300-foot-long tie-in with an existing city main located on Cesar Chavez Street.	Start 4th Quarter 2006	Paved	None	None	None
Process water supply line	Open pipeline trench and box culvert to local tie-in location	An approximately 0.76 mile tie-in with a City combined sewer system to a new treatment plant located within the site.	Start 4th Quarter 2006	Paved	None	None	None
115-kV transmission lines	Open duct trench to local tie-in location	Approx. 3,000-foot-long underground line to connect the plant switchyard with the existing Potrero substation.	Start 2nd Quarter 2006	Paved	None	None	None

8.2.4.1 Standards of Significance

Impacts on biological resources are considered significant if one or more of the following conditions could result from implementation of the proposed project:

- Substantial effect, reduction in numbers, restricted range, or loss of habitat for a population of a state or federally listed threatened or endangered species.
- Substantial effect, reduction in numbers, restricted range, or loss of habitat for a population of special-status species, including fully protected, candidate proposed for listing, CSC, and certain CNPS list designations.
- Substantial interference with the movement of any resident or migratory fish or wildlife species.
- Substantial reduction of habitat for native fish, wildlife, or plants.
- Substantial disturbance of wetlands, marshes, riparian woodlands, and other wildlife habitat.
- Removal of trees designated as heritage or significant under County or local ordinances.

8.2.4.2 Potential Impacts of Construction and Operation of SFERP Project Site and Temporary Construction Laydown Area

The SFERP plant site would permanently occupy approximately 4 acres of existing industrial development. This area is currently characterized by gravel and dirt surfaces with patches of ruderal areas supporting sparse non-native vegetation. The project site has a history of industrial use and is surrounded by a variety of industrial uses primarily associated with the Port of San Francisco. The site provides little or no habitat value for native plant and wildlife species. The construction laydown area will be approximately 8.5 acres. The laydown area would be located directly east and adjacent to the project site, between 25th and Cesar Chavez streets and between the project site and the Bay (see Figure 8.2-2). This proposed laydown area has been recently graded and partially graveled.

8.2.4.2.1 Special-Status Species. No special-status plant or wildlife species were observed on the proposed project site and vicinity during the 2005 reconnaissance survey for this project, the 2003 reconnaissance survey for the Mirant site location (described in Section 9, Alternatives), or the 1999 and 2000 surveys performed for the nearby proposed PPPU7 (Mirant Potrero LLC, 2000). No records of historical special-status species sightings were included in the CNDDB for this area. CNDDB records for three special-status plant species (adobe sanicle, alkali milk-vetch, and San Francisco owl's-clover) are located approximately a mile west of the site (Figure 8.2-1). All three records are over 100 years old and the species are now considered locally extirpated. The site and laydown areas are dominated by industrial development and do not support likely habitat for any special-status plant or wildlife species. Seasonal botanical and wildlife surveys are not necessary.

Due to the lack of biological resources, SFERP's construction would not result in significant impacts to special-status plant and wildlife species. The following paragraphs describe the potential for impacts associated with different components of SFERP site construction and operation.

8.2.4.2.2 Wetlands and Waters of the U.S. No jurisdictional wetlands or waters are present on the project site. Project construction would not cause loss or fill of any wetlands.

Cooling water discharged from the plant cooling system and other plant wastewater will be sent to the Southeast Water Pollution Control Plant (SEWPCP) via the City's combined sewer system. Likewise, stormwater runoff from the site will be sent to the SEWPCP via the combined sewer system.

Water will be applied to the site and laydown area for dust control during construction. Erosion and sediment washed into surface waters would be potentially harmful to San Francisco Bay water quality. As discussed further in Subsections 8.9 (Agriculture and Soils) and 8.14 (Water Resources), the Applicant will prepare an erosion and sediment control plan that specifies best management practices (BMPs) to be implemented during all project activities to avoid sediment runoff and erosion that would cause water quality degradation.

8.2.4.2.3 Cooling Tower Drift. Cooling tower drift is the fine mist of water droplets that escape the cooling tower's mist eliminators and are emitted into the atmosphere. Cooling towers concentrate the particulates (total dissolved solids) during the cooling process and produce a salt mist. At high concentrations, salts can physically damage leaf cells, which affects the photosynthetic ability of the plant. Other effects include blocking the stomata (leaf pores) so that normal gas exchange is impaired, as well as affecting leaf adsorption and solar radiation reflectance. These effects can reduce productivity in crops, trees, and sensitive special-status plant species in a deposition area.

Studies performed by Lerman and Darley (1975) concluded that particulate deposition rates of 365 grams per square meter per year ($g/m^2/year$) caused damage to fir trees, but rates of 274 $g/m^2/year$ and 400 to 600 $g/m^2/year$ did not cause damage to vegetation at other sites. Pahwa and Shipley (1979) exposed vegetation (corn, tobacco, and soybeans) to varying salt deposition rates to simulate drift from cooling towers that use saltwater (20,000 to 25,000 parts per million [ppm]) in the circulation water. Salt stress symptoms on the most sensitive crop plants (soybeans) were barely perceptible effects at a deposition rate of 2.98 $g/m^2/year$ (Pawha and Shipley, 1979).

Assuming a particulate deposition rate of 2 centimeters per second and a maximum salt concentration of 0.10 micrograms per cubic meter ($\mu g/m^3$) (the maximum modeled annual average particulate matter concentrate from the cooling tower), the maximum expected deposition rate is 3.091 kg/hectare/year or 0.309 $g/m^2/year$, which is significantly less than levels expected to cause barely perceptible effects to the most sensitive crop plants.

8.2.4.2.4 Cooling Effluent and Discharge. Process water for the SFERP power plant operations will be supplied from the City's combined sewage system and go through a new onsite water treatment plant. This system is further discussed in Section 7 (Water Supply) and Subsection 8.2.4.3. Water will be discharged to the plant wastewater sump, and then to the City's combined sewer system. Since the SFERP project will draw process water from, and discharge wastewater into, the combined sewer system, there will be no mechanism to affect fish or other aquatic biota from securing or discharging water during operations.

8.2.4.2.5 Combustion Turbine Emissions

Potential Impacts to San Bruno Mountain. Air emissions from the three combustion turbine exhaust stacks include nitrogen oxides (NOx), sulfur oxides (SOx), and particulates (PM10). Nitrogen oxide gases (NO, NO_2) convert to nitrate particulates in a form that is suitable for uptake by most plants. As stated previously, increased nitrate availability could potentially impact the natural serpentine vegetation community on San Bruno Mountain. The nonnative annuals could out-compete the native serpentine plants. However, prevailing wind patterns in the area would generally drive the plume inland across the Bay and away from San Bruno Mountain.

Nitrogen dioxide is potentially phytotoxic, but generally at exposures considerably higher than those resulting from most industrial emissions. Exposures for several weeks at concentrations of 280 to 490 $\mu g/m^3$ can cause decreases in dry weight and leaf area. One-hour exposures of at least 18,000 $\mu g/m^3$ are required to cause leaf damage. The predicted maximum annual average NO_2 of 0.1 $\mu g/m^3$ are far below these threshold limits. In addition, the total predicted maximum 1-hour NO_2 concentrations of 8.3 $\mu g/m^3$ (with infrequent concentrations of 115 $\mu g/m^3$ during simultaneous startups of all three combustion turbine generators [CTGs]) would be significantly smaller than the 1-hour threshold (7,500 $\mu g/m^3$ or 3,989 ppm) for 5 percent foliar injury to sensitive vegetation (USEPA, 1979). This indicates that NO_x emissions from the SFERP, when considered in the absence of other air pollutants, would not adversely affect the physical functions of plants in the area.

The existing background nitrogen deposition rate at San Bruno Mountain is estimated to be 6.169 kg/ha/year (see Appendix 8.2C for derivation of existing background rate). The average modeled nitrogen deposition from the project over the area is estimated to be 0.0059 kg/ha/year, or less than 0.1 percent of background. The modeling methodology is described in detail in Appendix 8.2C. The total nitrogen deposition is thus 6.169 plus 0.0059, or 6.175 kg/ha/year.

This modeling analysis does not take into account the NO_x emission reduction credits (ERC) being provided for the project, which will offset much of the nitrogen emissions increase from SFERP.

In addition, this modeling analysis does not consider NO_x emission reductions from the closure of existing in-City generation facilities. The City is pursuing the SFERP project to support closure of existing generation facilities in San Francisco while maintaining electrical reliability. The Hunters Point Power Plant should be closed prior to the in-service date of the SFERP, with the construction of the 230-kV Jefferson-Martin transmission line and a series of additional projects that are currently underway. The California Independent System Operator (CAISO) has confirmed that once the Jefferson-Martin line and eight additional transmission projects that are currently in service or under development are in service, the SFERP, along with another City sponsored generation project at the San Francisco Airport, will also provide for closure of Potrero Unit 3. The CAISO also indicated that with the addition of four transmission projects, the City generation projects will provide for closure of Potrero Units 4, 5 and 6 in 2007.

Current nitrogen deposition impacts on San Bruno Mountain reflect the impacts of operation of the Hunters Point and Potrero power plants. Therefore, historical operation of those power plants provides a baseline for the assessment of potential future cumulative impacts.

Three potential future operating scenarios were evaluated. In the first scenario, it was assumed that both Potrero and Hunters Point power plants would continue to operate at historical levels (that is, future annual heat input to each unit would be equal to the average annual heat input over the past 3 years), that the boilers at each plant would meet the 2006 NO_x regulatory limit of 0.018 pounds per million British Thermal Units (lb/MMBtu) contained in the Bay Area Air Quality Management District's (BAAQMD) Rules and Regulations using selective catalytic reduction (SCR) systems with 10 ppm ammonia slip to reduce NO_x emissions on the steam boiler units at Potrero and Hunters Point power plants, and that no additional controls would be installed on the peaking turbines. In the second scenario, it was assumed that the Potrero power plant would continue to operate at historical levels, with Unit 3's NO_x emissions controlled using SCR to meet the BAAQMD's regulatory NO_x limit (0.018 lb NO_x /MMBtu effective 1/1/06) with 10 ppm ammonia slip (corrected to 3 percent O_2), and that the Hunters Point power plant would be shut down. In the third scenario, it was assumed that both the Potrero and Hunters Point power plants would be shut down. All scenarios include the NO_x reductions from the offsets to be provided for SFERP.

Calculations for each scenario are shown in Appendix 8.2C, Table 8.2C-4. These calculations show that even with SFERP and continued operation of the Hunters Point and Potrero power plants with the required SCR control in place, there will be a net reduction of over 52 tons per year of nitrogen emissions in southeast San Francisco. Even with the addition of SFERP and the continued operation of the Potrero power plant, the shutdown of Hunters Point will result in a net reduction in nitrogen emissions of approximately 86 tons per year. If both the Potrero and Hunters Point power plants are shut down, the area will see a net reduction in nitrogen emissions of about 169 tons per year.

The habitats and special-status species of San Bruno Mountain are managed under the San Bruno Mountain Habitat Conservation Plan (HCP). Of chief concern are three special-status butterfly species: the mission blue butterfly, (*Plebejus icarioides missionensis*), San Bruno elfin butterfly (*Incisalia mossi bayensis*), and the callippe silverspot butterfly (*Speyeria callippe callippe*). The mission blue butterfly and the San Bruno elfin butterfly are federal-listed as endangered. The callippe silverspot butterfly is federal-listed as threatened. San Bruno Mountain is designated critical habitat for the Bay checkerspot butterfly (*Euphydryas editha* ssp. *bayensis*); however, the population is now considered extinct.

All three species depend on nectar from a variety of sources but require specific larval host plants. Mission blue butterfly larvae feed exclusively on lupine species (*Lupinus albifrons*, *Lupinus variicolor*, and *Lupinus formusus*), which grow in open grassland habitat, rocky slopes, and disturbed areas. California golden violet (*Viola pedunculata*) is the host plant of the callippe silverspot butterfly and is found in a variety of habitats including open grasslands and chaparral. The host plant for the San Bruno elfin butterfly is the pacific stone crop (*Sedum spathufolium*), which is typically found around rocky outcrops. All three butterfly species have been listed primarily due to habitat loss; however, their host plants are not considered rare.

The primary threat to the three butterfly species at San Bruno Mountain is habitat loss due to the encroachment of non-native species and the expansion of coastal scrub vegetation (Kobernus, 2004). The associated larval host plants are not associated with serpentine soils

and there is a lack of specific data suggesting that nitrogen deposition is a contributing factor to invasive plant growth in San Bruno Mountain butterfly habitat (Kobernus, 2004).

San Bruno Mountain is characterized by a variety of habitats including grassland, woodland, chaparral, coastal scrub, and wetland vegetation communities. The majority of the ten rare plant species identified on San Bruno Mountain are associated with chaparral and coastal scrub communities. Coast rock cress (*Arabis blepharophylla*) and San Franciscan wallflower (*Erysimum franciscanum*) are the only identified special-status plant species associated with serpentine soils. Both species are also associated with other habitats found on San Bruno Mountain and are not exclusive to serpentine conditions.

Nitrogen deposited on the ground must be converted to plant-available forms of nitrogen to affect plant nutrition. Absorption of NO_3 and NH_3 by plant roots is the predominate mode of plant nitrogen nutrition (Marschner, 1995). Nitrogen fertilization of nutrient-poor soils increases nitrogen absorption by plant roots and, consequently, increases the growth rate and biomass production of many species, including the non-native annual grass species that tend to invade native California grasslands. Endemic serpentine vegetation is particularly sensitive to competition from fast growing annual grasses. Serpentine soil communities are relatively nutrient poor and represent the habitat most vulnerable to nitrogen deposition in the Bay Area. Although most vegetation communities are sensitive to competition from invasive non-native plants, including grasses, the following analysis will focus on serpentine grasslands as the worst case scenario.

When soils are fertilized by artificial nitrogen sources, those nitrogen sources are available to all plant species. However, non-native grasses usually have more vigorous growth habitats than serpentine species. The threshold of annual nitrogen deposition rates that can potentially influence ecosystem change to herbaceous plant communities is approximately 5 to 6 kg/ha/year (Calpine Corporation, 2003). Increased fertilization and subsequent succession of endemic serpentine species to non-native grasses currently occurs in grassland habitats throughout the Bay Area. Cattle-grazing has become an important management tool for control of non-native grasses, which increases the survival potential of endemic serpentine plant species and endemic invertebrate species such as the Bay checkerspot butterfly.

Background nitrogen deposition rates at San Bruno Mountain are estimated to be approximately 6.169 kg/ha/year. According to nitrogen deposition modeling results, SFERP operation would result in an additional annual average nitrogen deposition of 0.0059 kg/ha/year on San Bruno Mountain. This amounts to a 0.0009 percent increase from ambient levels for a total of approximately 6.175 kg/ha/year. This estimate indicates that current deposition rates already fall within the 5 to 6 kg/ha/year expected to affect herbaceous plants. The potential for deposition from SFERP operation to initiate transformation of vegetation communities on San Bruno Mountain and East Bay is unlikely. Deposition impacts to serpentine communities on San Bruno Mountain most likely already exist, and any potential incremental increase from SFERP operation would be considered cumulative, although very slight. (This analysis assumes continued operation of the Hunters Point and the Potrero power plants.) This scenario is very conservative and highly unlikely as the Hunters Point power plant is expected to be shut down, as described in Section 3, Purpose and Need. Moreover, as described in that section and summarized above, the City is pursuing the SFERP to facilitate the closure of the Potrero power plant.

In addition, the level of nitrogen deposition from the SFERP on plant-available nitrogen would actually be less than the calculated amount because the deposition will be distributed in small amounts during the year and not all of the nitrogen added to the soil during each deposition event is available for plant use due to losses associated with soil processes.

8.2.4.2.6 Noise and Lights from Plant Operations. The SFERP site is zoned industrial and is surrounded by several industrial facilities adjacent to the site. These facilities typically operate 24 hours per day, 7 days per week and have standard industrial lighting and noise emissions. Operation of the plant would produce some noise, as described in Subsection 8.5, Noise. Noise and construction activities would not likely adversely impact wildlife, due to existing noise levels and the lack of local wildlife attractants in the immediate vicinity.

Bright night lighting could disturb wildlife (e.g., nesting birds, foraging mammals, and flying insects). Night lighting is also suspected to attract migratory birds to some areas and, if the lights are on tall buildings or the combustion turbine exhaust stacks, collisions could occur. However, the exhaust stack height of 85 feet is lower in profile than much of the surrounding development. In comparison, stack heights for the nearby Portrero Power Plant's Unit 3 is about 300 feet. As described in Subsection 8.11, Visual Resources, any required stack and facility lighting will be pointed down to minimize impacts.

8.2.4.2.7 Potential for Collision and Electrocution Hazard to Birds. The project would construct three 85-foot-high exhaust stacks that could potentially result in bird collisions. The new approximately 3,000-foot-long electrical transmission lines will be buried, eliminating impacts associated with bird electrocution and collision with aboveground lines. Most collisions involve nocturnal migrants flying at night in inclement weather and low-visibility conditions, colliding with tall guyed television or radio transmission towers (CEC, 1995; Kerlinger, 2000 in Final Staff Assessment for Contra Costa Power Plant). Migratory birds generally fly at an altitude that would avoid ground structures, except when crossing over topographic features (e.g., ridge tops) or when inclement weather forces them down closer to the ground. A large number of birds migrate along the Pacific Coast, passing through the San Francisco Bay Area. The project area is within a known path for nocturnally migrating birds. However, there are no topographic or ecological features that would attract birds to this location or "funnel" them into the vicinity of exhaust stacks or other elevated features of the project. Because of the relatively low structure height and lack of guy wires and aboveground transmission lines, the potential for bird collisions with stacks and other project structures is considered less than significant.

8.2.4.3 Impacts of Natural Gas and Water Pipeline Construction and Operation

Fuel will be delivered to SFERP via a new 900-foot-long pipeline, to PG&E's San Francisco Line 101, located west of the project site. The primary method of pipeline construction includes excavation of an open trench approximately 4 feet deep and 3 to 7 feet wide, depending on site-specific soil type. The construction corridor will be approximately 50 feet wide. The pipeline corridor will require pavement and concrete cuts and does not intersect sensitive environmental resources. The temporary construction corridor will be used to store the excavated soil, provide access for equipment and vehicles, and space for welding the pipeline prior to installation and backfill.

The project will use recycled water for the majority of its water needs. The system will include a new water treatment facility to be constructed in a pre-engineered building on the SRERP site. A pipeline will be constructed to divert effluent from the City's combined sewer system collection station near Marin Street (see Figure 8.2-2). The pipeline will be approximately 0.76 mile long and the primary method of construction includes locating approximately 1,300 feet of new piping within an existing underground structure (collection box) and approximately 2,700 feet of open trench excavation (approximately 4 feet deep and 3 to 7 feet wide, depending on site-specific soil types) for the remaining pipeline. The construction corridor will be approximately 25- to 75-feet wide. The pipeline corridor will require pavement and concrete cuts and does not intersect sensitive environmental resources. The temporary construction corridor will be used to store the excavated soil, provide access for equipment and vehicles, and space for handling the pipeline prior to installation and backfill.

Potable water will be supplied by a City main located on Cesar Chavez Street. There are no significant habitats present that would be adversely affected by temporary construction of the gas or water lines. Therefore, construction is not likely to result in any impacts to biological resources.

8.2.4.3.1 Special-Status Species. Construction of the gas and water pipelines will be confined to road cuts in an industrial area. The work area is adjacent to industrial and commercial development, which are not characterized by natural habitat and do not provide significant biological resources for special-status plant and wildlife species.

8.2.4.3.2 Wetlands and Waters. The gas and water pipelines will not cross any jurisdictional wetlands or navigable water features.

The pipelines will require pressure testing after construction to ensure welds are tight and to remove any accumulated dust or welding residue from the pipeline. To do this, the pipe is filled with water and pressurized, resulting in a potentially large volume of water. If disposed improperly this water could cause adverse effects on the water quality of receiving waters. The City proposes to dispose of pipe-testing water in the combined sewer system. Disposal to the sewer would ensure impacts of wastewater disposal are less than significant.

8.2.4.4 Conflict with Regional Habitat Conservation Plans

There are no countywide or regional Habitat Conservation Plans that would affect development in this industrial area of San Francisco. As discussed earlier, nitrogen deposition from NO_x and ammonia emissions are not expected to result in significant impacts within sensitive habitats covered by the San Bruno Mountain Habitat Conservation Plan.

8.2.4.5 Cumulative Impacts

The proposed project is located within a previously developed area surrounded by similar industrial development. The associated linear facilities will be short in length and will be located within previously developed areas. Air emissions have been projected to be insignificant and are not expected to impact local natural habitat or increase cumulative impacts in the area. The project is not expected to result in significant impacts and there are no other proposed projects in the study area (other than the proposed Potrero Unit 7) that

would have similar impacts on biological resources. The proponent of Potrero Unit 7, Mirant, is in bankruptcy proceedings and the application for certification before the California Energy Commission is currently suspended. Further, it is formal City policy to oppose the construction of Potrero Unit 7. Accordingly, the City considers the construction of Potrero Unit 7 to be highly unlikely. Therefore, the SFERP project is not expected to contribute to any adverse cumulative impacts.

As described earlier, construction of the Jefferson-Martin transmission project along with eight additional transmission projects will eliminate the reliability need for the Hunter's Point Power Plant, which is adjacent to Heron's Head Park and the Bay. PG&E has an agreement with the City of San Francisco to decommission Hunter's Point PP when the plant is no longer needed for electric system reliability. The CAISO, which is responsible for the reliability of the electric system in much of California, has stated in writing that construction of the SFERP project along with four transmission projects expected to be in service by 2007, and another turbine at the San Francisco airport would allow for the release of the RMR Agreement for the Potrero PP without an adverse impact on reliability. Thus, construction of the SFERP would support the shutdown of an outdated and less efficient facility. Both the Hunters Point and Potrero power plants also take cooling water directly from the Bay, resulting in the potential impingement of fish, aquatic invertebrates, and other aquatic species. To the extent these plants are closed, this impact would be eliminated.

8.2.5 Proposed Mitigation and Monitoring

The construction and operation of the SFERP project is not expected to result in significant biological impacts; therefore, no biological monitoring is proposed and mitigation measures are limited to the following design guidelines intended to minimize avian impacts.

8.2.5.1 Foraging and Migratory Birds

The project site and transmission line design will minimize potential impacts to resident and migratory birds. The proposed mitigation measures include:

1. Underground transmission lines to prevent bird collisions and electrocutions commonly associated with aboveground lines.

2. Provide safety lighting that points downward on the turbine exhaust stacks to reduce avian collisions, if such lighting is required.

8.2.5.2 Nitrogen Deposition

Nitrogen deposition at San Bruno Mountain already exceeds the threshold limits of 5 to 6 kg/ha/year and so, to avoid the potential for significant cumulative impacts, ERCs are being surrendered to fully mitigate the project's impacts, as described in Subsection 8.1, Air Quality. The surrendering of ERCs will reduce the overall nitrogen emissions in the greater Bay Area due to the regulatory approach employed in BAAQMD's ERC program. When a facility such as SFERP is required to acquire ERCs for a project, it must secure and surrender a greater number of ERCs than the emissions of the pollutant. This is commonly defined as the offset ratio. The oxides of nitrogen emissions offset ratio in the BAAQMD is 1.15 to 1, which means that for every pound of oxides of nitrogen expected to be emitted from SFERP, 1.15 pounds of ERCs must be secured and surrendered. Further, the City has committed to

offsetting its emissions of oxides of nitrogen at a ratio of 1.19 to 1, which means that for every pound of oxides of nitrogen expected to be emitted from the SFERP, 1.19 pounds of ERCs will be secured and surrendered.

In addition, as described above, the Hunters Point power plant is expected to be shut down by the time the SFERP is placed in service. Moreover, with the Hunters Point power plant on a well-defined path for closure, the City is pursuing the SFERP and a small facility at the San Francisco Airport, to facilitate the closure of the Potrero PP. The permanent closure of Hunters Point power plant will reduce nitrogen emissions in the southeast San Francisco area by 57.9 tons per year. The permanent closure of the Potrero PP would reduce nitrogen emissions in southeast San Francisco by an additional 465 tons per year from historical levels that have contributed to background deposition concentrations. These reductions in the nitrogen emissions have the potential of reducing the nitrogen deposition on the San Bruno Mountain sensitive habitat areas.

8.2.6 Involved Agencies and Agency Contacts

Because the project has no federal nexus, will not impact any state or federal listed species or state species of concern and will not cross any streams, no agency contacts are provided.

8.2.7 Required Permits and Permit Schedule

Because no streams will be crossed, no federal, state, or local permits are required for Biological Resources.

8.2.8 References

American Ornithologist Union (AOU). 1983. Checklist of North American Birds 6th Ed, (with supplements through 1993). Washington, DC.

California Department of Fish and Game (CDFG). 2005. *California Natural Diversity Data Base*. Search of the Point Bonita, San Francisco North, San Francisco South, Hunter's Point, and Oakland West 7.5-minute USGS quadrangles. February 10, 2005.

California Energy Commission (CEC). 1995. *Avian Collision and Electrocution: An Annotated Bibliography*. P. 114.

California Energy Commission (CEC). 2002. *Final Staff Assessment for Potrero Power Plant Unit 7 Project*. California Energy Commission.

California Native Plant Society. 2001. Inventory of Rare and Endangered Vascular Plants of California.

Calpine Corporation. 2003 Metcalf Energy Center Ecological Preserve Annual Monitoring Report.

City and County of San Francisco, Department of the Environment. 1997. *The Sustainability Plan for the City of San Francisco.*

County of San Francisco. 1995. *Master Plan of the City and County of San Francisco.*

Jennings, M.R. 1983. *An Annotated Checklist of the Amphibians and Reptiles of California.* California Fish and Game. 69(3) 151-171.

Kerlinger, Paul. 2000. *Avian Mortality at Communication Towers: A Review of the Recent Literature, Research; and Methodology*. Prepared for U.S. Fish and Wildlife Service, Office of Migratory Bird Management. 38pp.

Kobernus, P. 2004. Personal communication with John Cleckler, September 2004. Patrick Kobernus is the San Bruno Mountain HCP administrator.

Lerman, S.L., and E.F. Darley. 1975. "Particulates," pp. 141-158. In J.B. Mudd and T.T. Kozlowski (eds.). *Responses of Plants to Air Pollution.* Academic Press. New York, NY.

Marschner, H. 1995. Mineral Nutrition of Higher Plants. Academic Press, New York, NY.

Mirant Potrero LLC. 2000. Application for Certification for the Potrero Power Plant Unit 7 Project.

NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life (web application). Version 4.2. NatureServe, Arlington, Virginia. http://www.natureserve.org/explorer.

Pahwa, S. and B. Shipley. 1979. A Pilot Study to Detect Vegetation Stress around a Cooling Tower. Presented at the 1979 Cooling Tower Institute Annual Meeting, Houston, Texas. Paper TP7903.

San Mateo County, Planning and Building Division Department of Environmental Management. 1986. *San Mateo County General Plan.*

Skinner, M.W. and B.M. Pavlik (eds). 1994. *Inventory of Rare and Endangered Vascular Plants of California.* California Native Plant Society Special Publication No. 1 (Fifth edition). Sacramento, California. 338 pp.

U.S. Environmental Protection Agency (USEPA). 1979. Air Quality Criteria for Carbon Monoxide, Office of Research and Development.

Zeiner, D.C, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990a. *California's Wildlife, Volume 2: Birds.* California Department of Fish and Game. Sacramento.

Zeiner, D.C, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990b. *California's Wildlife, Volume 3: Mammals.* California Department of Fish and Game. Sacramento.

Zeiner, D.C, W.F. Laudenslayer, Jr., K.E. Mayer, and M. White. 1990c. *California's Wildlife, Volume 1: Amphibians.* California Department of Fish and Game. Sacramento.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Plants					
Franciscan manzanita	*Arctostaphylos hookeri* ssp. *franciscana*	FSC, 1A	Coastal scrub (serpentinite).	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Evergreen shrub. Last recorded in 1942. Now only grown in cultivation. Nitrogen emissions will not impact serpentine habitat.
Presidio manzanita	*Arctostaphylos hookeri* ssp. *ravenii*	FE, CE, 1B	Chaparral, coastal prairie, coastal scrub/serpentine outcrop.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Evergreen shrub. Currently known only from the Presidio area. Nitrogen emissions will not impact serpentine habitat.
San Francisco gumplant	*Grindelia hirsutula* var. *maritima*	FSC, 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland/sandy or serpentinite.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Perennial herb. Nitrogen emissions will not impact serpentine habitat.
Marin western flax	*Hesperolinon congestum*	FT, CT, 1B	Chaparral, valley and foothill grassland/serpentinite.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. Nitrogen emissions will not impact serpentine habitat.
white-rayed pentachaeta	*Pentachaeta bellidiflora*	FE, CE, 1B	Valley and foothill grassland (often on serpentine).	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. Currently known from one location near Highway 280. Nitrogen emissions will not impact serpentine habitat.
adobe sanicle	*Sanicula maritima*	FSC, 1B	Chaparral, coastal prairie, meadows and seeps, valley and foothill grassland/clay, serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Perennial herb. Nitrogen emissions will not impact serpentine habitat.
Santa Cruz microseris	*Stebbinsoseris decipiens*	FSC, 1B	Broadleaved upland forest, closed-coned coniferous forest, chaparral, coastal prairie, coastal scrub, valley and foothill grassland/open areas, sometimes on serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. Nitrogen emissions will not impact serpentine habitat.
San Francisco owl's-clover	*Triphysaria floribunda*	FSC, 1B	Coastal prairie, coastal scrub, valley and foothill grassland/usually serpentine.	Low. Project area is industrial and has no native soils. May be found on San Bruno Mountain.	Annual herb. Nitrogen emissions will not impact serpentine habitat.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Invertebrates					
Bay checkerspot butterfly	*Euphydryas editha bayensis*	FT	Serpentine grassland with adult nectar sources and larval host plant (dwarf plantain and owls clover).	Low. Project area is industrial and has no native soils or associated nectar sources. Historically found on San Bruno Mountain.	SFERP nitrogen emissions will not likely impact butterfly host and nectar plants located in surrounding serpentine habitat.
Mission blue butterfly	*Icaricia icarioides missionensis*	FE	Dunes and grassland areas with *Lupinus* host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Restricted to three metapopulations including San Bruno Mountain in San Mateo County, Twin Peaks in San Francisco, and the vicinity of Skyline College in San Mateo County, California (NatureServe, 2005). SFERP Nitrogen emissions will not likely impact this species' host and nectar plants.
San Bruno elfin butterfly	*Incisalia mossii bayensis*	FE	Wooded canyons with cliffs and rocky outcrops. Stonecrop host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Current population restricted to San Bruno Mountain, Milagra Ridge, Montara Mountain, and Whiting Ridge (Natureserve, 2003). SFERP nitrogen emissions will not likely impact this species' host and nectar plants.
callippe silverspot butterfly	*Speyeria callippe callippe*	FE	Dry woodlands, foothill grasslands, and chaparral communities. Violet host plant.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	Closest metapopulation found on San Bruno Mountain. SFERP nitrogen emissions will not likely impact this species' host and nectar plants.
Opler's longhorn moth	*Adela oplerella*	FSC	Serpentine grasslands with its larval food plant, California cream cups.	Low. Project area is industrial and has no native soils or associated nectar sources. Found on San Bruno Mountain.	SFERP nitrogen emissions will not likely impact this specie's host and nectar plants located in surrounding serpentine habitat.
Birds					
California brown pelican	*Pelecanus occidentalis californicus*	FE, CE	Coastal, pelagic, and offshore islands. Breeding colonies typically on offshore islands.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
double-crested cormorant	*Phalacrocorax auritus*	CSC	Found along the coast and inland water bodies. Typically nest colonial in trees or rocky areas near water.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Long-billed curlew	*Numenius americanus*	FSC, CT, MB	Winter habitat is primarily open land near, wetland, and agricultural fields in the Central Valley.	Low. Project area is industrial and has no biological resources to attract wildlife.	Winters in Central Valley. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
bank swallow	*Riparia riparia*	FSC, CT	Typically in riparian areas or near water. Colonial nester in burrows in coastal bluffs, cliffs, and banks.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
California least tern	*Sterna antillarum browni*	FE, CE	Coastal. Nest on sandy beaches and mud flats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Bald eagle	*Haliaeetus leucocephalus*	FT, MB	Primary presence in California during winter migration. Associated with a variety of habitats. Nest sites typically found in fork of tall tree or ledges near water.	Low. Project area is industrial and has no biological resources to attract wildlife.	Migration season autumn through late winter. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Cooper's hawk	*Accipiter cooperii*	CSC	Woodland and otherwise forested areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
western snowy plover	*Charadrius alexandrinus nivosus*	FT, CSC	Coastal. Sandy beaches and mudflats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
northern harrier	*Circus cyaneus*	CSC	Wetlands, marshes, and open fields.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
white-tailed kite	*Elanus leucurus*	FSC, FP, MB	Abundant in California's Central Valley where it is commonly associated with riparian and open habitats. Their platform nests are located in trees or shrubs.	Low. Project area is industrial and has no biological resources to attract wildlife.	Typically breed between January and August. Primarily a local resident and is known to form communal roosts in the fall and winter. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	FSC, CSC	Dense marsh and riparian vegetation.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Loggerhead shrike	*Lanius ludovicianus*	FSC, CSC, MB	Typically associated with open lowland and foothill scrub or riparian woodland habitats with adequate hunting perches. Nests are typically well-concealed and built in dense shrubs or trees.	Low. Project area is industrial and has no biological resources to attract wildlife.	Largely nonmigratory and has been known to defend year-round territories. In California the breeding period typically begins in March and may extend into August. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Red knot	*Calidris canutus*	FSC	Coastal. Sandy beaches and mudflats.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Vaux's swift	*Chaetura vauxi*	FSC, CSC	Woodland areas near water. Old growth coniferous and deciduous forest. Cavity nester.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Black swift	*Cypseloides niger*	FSC, CSC	Woodland and riparian areas near water. Cliff nester, often behind waterfalls.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Little willow flycatcher	*Empidonax traillii brewsteri*	CE, MB	Associated with dense willow riparian vegetation.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding May-September. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
American peregrine falcon	*Falco peregrinus anatum*	FD, CE, MB	Typically found along mountain ranges, river valleys, and coast lines. Nests are simple scrapes and often located on cliff ledges or other platform surfaces.	Low. Project area is industrial and has no biological resources to attract wildlife.	The breeding season typically begins in March. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Black oystercatcher	*Haematopus bachmani*	FSC	Typically found along rocky coasts and island areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding typically begins in the late spring. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Harlequin duck	*Histrionicus histrionicus*	FSC, CSC	Habitat includes a variety of aquatic areas in the northwestern US and Canada. Typically breeds along mountain streams and lakes. Nonbreeding birds often found offshore.	Low. Project area is industrial and has no biological resources to attract wildlife.	Current distribution is rare in California. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Marbled godwit	*Limosa fedoa*	FSC	Breeding habitat typically found on the plains of Canada and the northern US. Nonbreeding habitat includes coastal areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Significant migration along the California Coast. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Lewis' woodpecker	*Melanerpes lewis*	FSC, MB	Associated with open forest and oak woodlands. Found along riparian woodland corridors in Central California. Cavity nester.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding season begins in mid-April. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
whimbrel	*Numenius phaeopus*	FSC	Nesting areas found in the tundra areas of the far north. Nonbreeding habitat includes coastal areas.	Low. Project area is industrial and has no biological resources to attract wildlife.	Found along the Pacific Coast in the winter. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Ashy storm-petrel	*Oceanodroma homochroa*	FSC, CSC	Open ocean. Typically nests on islands. The Farallon Islands off of San Francisco are a crucial nesting location.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Black skimmer	*Rynchops niger*	FSC, CSC	Found along coastal areas and sometimes on inland freshwater areas. Primarily nest on protected sandy.	Low. Project area is industrial and has no biological resources to attract wildlife.	Primarily breeds in southern California. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Rufus hummingbird	*Selasphorus rufus*	FSC, MB	Occur in coniferous forest and riparian woodlands in the Central Valley with nearby nectar sources. Build cup nest in trees, shrubs.	Low. Project area is industrial and has no biological resources to attract wildlife.	Typically breeds in California March-July. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Allen's hummingbird	*Selasphorus sasin*	FSC	Coastal chaparral, brushland, and forests edges.	Low. Project area is industrial and has no biological resources to attract wildlife.	Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Elegant tern	*Sterna elegans*	FSC, CSC	Found along coastal areas and occasionally on inland lakes. Typically nest on sandy beaches.	Low. Project area is industrial and has no biological resources to attract wildlife.	Currently known to breed in only five sites in southern California and northwestern Mexico. San Francisco is part of the nonbreeding range. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Tricolored blackbird	*Agelaius tricolor*	CSC, MB	Associated with wetland areas with dense vegetation such as cattails, tule, bulrush. Forage in grassland and agricultural fields.	Low. Project area is industrial and has no biological resources to attract wildlife.	Nest in large colonies. Breeding season is April-July; however has also been reported in October and November. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.

TABLE 8.2-2
Special-Status Species Potentially Occurring in SFERP Project Area (as indicated by CNPS, USFWS, CNDDB, and site reconnaissance)

Common Name	Scientific Name[a]	Status[b]	Primary Habitat[d]	Potential Occurrence in Project Area	Comments
Western burrowing owl	*Athene cunicularia hypugaea*	FSC, CSC, MB	Habitats includes open grassland habitat with fossorial mammal burrows, often associated with ground squirrels. Use small mammal burrows for cover and natal dens.	Low. Project area is industrial and has no biological resources to attract wildlife.	Breeding season is typically from February through August. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.
Ferruginous hawk	*Buteo regalis*	FSC, MB	Associated with a variety of habitats but commonly found in open grassland areas. Use large stick nests in trees.	Low. Project area is industrial and has no biological resources to attract wildlife.	Uncommon winter resident in California. Breeding typically from March-July. Because of low structure height and underground transmission lines, potential for bird collisions is less than significant.

SOURCE: California Dept. of Fish and Game, 2005; California Native Plant Society, 2001.

Notes:
[a] Scientific names are based on the following sources: AOU (1983); Jennings (1983); Zeiner et al. (1990a-c).
[b] Status. Status of species relative to the Federal and California State Endangered Species Acts and Fish and Game Code:

Federal Status
FE Federally listed as endangered.
FT Federally listed as threatened.
FPE Proposed endangered.
FPT Proposed threatened.
Candidate for listing as federally endangered or threatened. Proposed rules have not yet been issued because they have been precluded at present by other listing activity.
FD Delisted from Federal threatened or endangered status.
FSC Federal Species of Special Concern. Proposed rules have not yet been issued because they have been precluded at present by other listing activity.
MB Migratory Bird Treaty Act. of 1918. Protects native birds, eggs, and their nests.

California Status
CE State listed as endangered. Species whose continued existence in California is jeopardized.
CT State listed as threatened. Species that although not presently threatened in California with extinction are likely to become endangered in the foreseeable future.
CSC California Department of Fish and Game "Species of Special Concern." Species with declining populations in California.
FP Fully protected against take pursuant to the Fish and Game Code Sections 3503.5, 3511, 4700, 5050, 5515.

Other Status.
CNPS California Native Plant Society Listing (does not apply to wildlife species).
Plants, rare, threatened or endangered in California and elsewhere and are rare throughout their range. According to CNPS, all of the plants constituting List 1B meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection) of the California Department of Fish and Game Code and are eligible for state listing.

[c] Season. Blooming period for plants. Season of use for animals. RES = Resident; SUMR = Summer; WNTR = Winter.
[d] Primary Habitat. Most likely habitat association.

1, ADOBE SANICLE
2, ALKALI MILK-VETCH
3, AMERICAN BADGER
4, ANGEL ISLAND MOLE
5, ARCUATE BUSH MALLOW
6, BANK SWALLOW
7, BAY CHECKERSPOT BUTTERFLY
8, BEACH LAYIA
9, BENT-FLOWERED FIDDLENECK
10, BUMBLEBEE SCARAB BEETLE
11, BURROWING OWL
12, CALIFORNIA BLACK RAIL
13, CALIFORNIA CLAPPER RAIL
14, CALIFORNIA LEAST TERN
15, CALIFORNIA RED-LEGGED FROG
16, CALIFORNIA SEABLITE
17, CALIFORNIA TIGER SALAMANDER
18, CALLIPPE SILVERSPOT BUTTERFLY
19, CHORIS'S POPCORN-FLOWER
20, COASTAL TRIQUETRELLA
21, COMPACT COBWEBBY THISTLE
22, COOPER'S HAWK
23, DARK-EYED GILIA
24, DIABLO HELIANTHELLA
25, DOUBLE-CRESTED CORMORANT
26, DUNE GILIA
27, FRAGRANT FRITILLARY
28, FRANCISCAN MANZANITA
29, FRANCISCAN THISTLE
30, KELLOGG'S HORKELIA
31, MARIN WESTERN FLAX
32, MARSH MICROSERIS
33, MARSH SANDWORT
34, MIMIC TRYONIA (=CALIFORNIA BRACKISHWATER SNAIL)
35, MISSION BLUE BUTTERFLY
36, MONARCH BUTTERFLY

37, M
38, N
39, N
40, P
41, P
42, P
43, R
44, R
45, R
46, R
47, S
48, S
49, S
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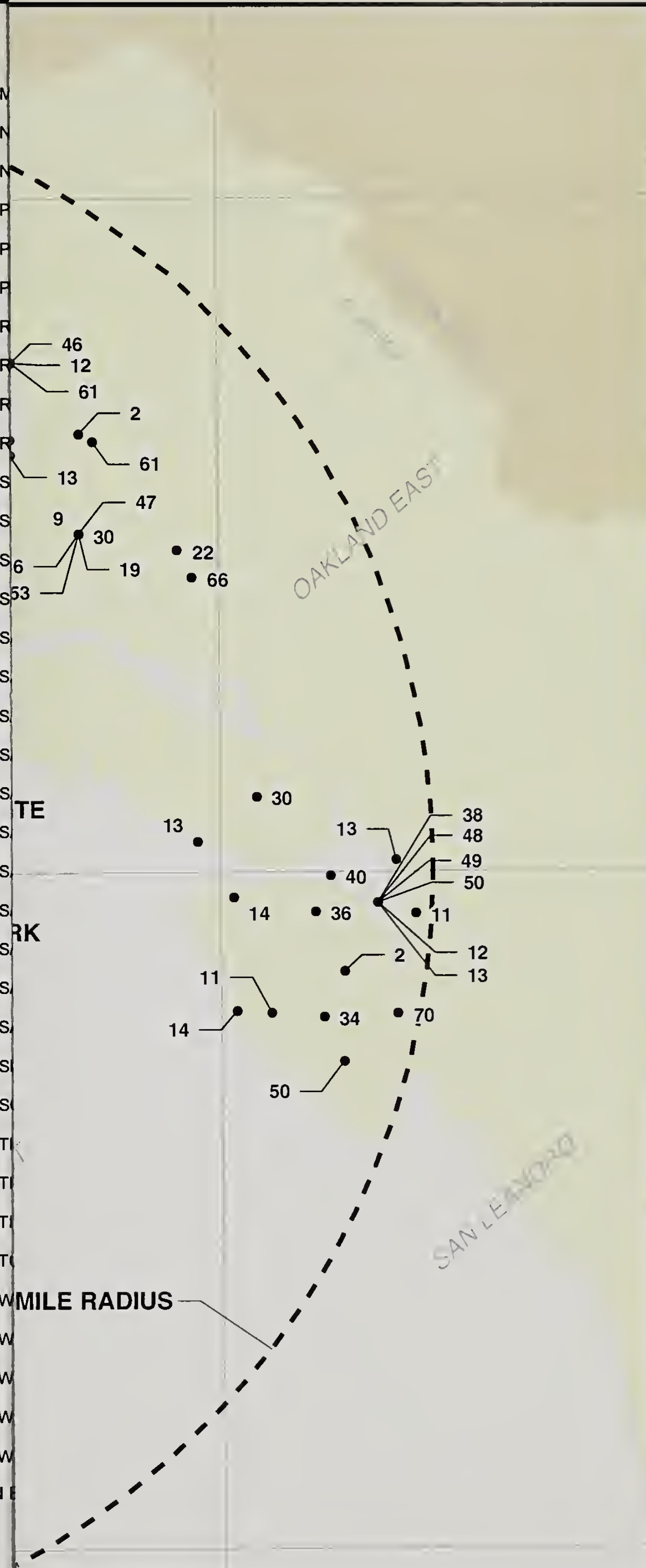


N

0 2.25 4.5 Miles

FIGURE 8.2-1
SPECIAL-STATUS SPECIES WITHIN A 10-MILE RADIUS OF THE SFERP SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\SFPUC\MXDS\8_2-1_CNDDB_SUPPLEMENTA.MXD 2/22/2

1. ADOBE SANICLE
2. ALKALI MILK-VETCH
3. AMERICAN BADGER
4. ANGEL ISLAND MOLE
5. ARCUATE BUSH MALLOW
6. BANK SWALLOW
7. BAY CHECKERSPOT BUTTERFLY
8. BEACH LAYIA
9. BENT-FLOWERED FIDDLENECK
10. BUMBLEBEE SCARAB BEETLE
11. BURROWING OWL
12. CALIFORNIA BLACK RAIL
13. CALIFORNIA CLAPPER RAIL
14. CALIFORNIA LEAST TERN
15. CALIFORNIA RED-LEGGED FROG
16. CALIFORNIA SEABLITE
17. CALIFORNIA TIGER SALAMANDER
18. CALLIPPE SILVERSPOT BUTTERFLY
19. CHORIS'S POPCORN-FLOWER
20. COASTAL TRIQUETRELLA
21. COMPACT COBWEBBY THISTLE
22. COOPER'S HAWK
23. DARK-EYED GILIA
24. DIABLO HELIANTHELLA
25. DOUBLE-CRESTED CORMORANT
26. DUNE GILIA
27. FRAGRANT FRITILLARY
28. FRANCISCAN MANZANITA
29. FRANCISCAN THISTLE
30. KELLOGG'S HORKELIA
31. MARIN WESTERN FLAX
32. MARSH MICROSERIS
33. MARSH SANDWORT
34. MIMIC TRYONIA (=CALIFORNIA BRACKISHWATER SNAIL)
35. MISSION BLUE BUTTERFLY
36. MONARCH BUTTERFLY
37. MONTARA MANZANITA
38. NORTHERN COASTAL SALT MARSH
39. NORTHERN HARRIER
40. POINT REYES BIRD'S-BEAK
41. PRESIDIO CLARKIA
42. PRESIDIO MANZANITA
43. ROBUST SPINEFLOWER
44. ROSE LEPTOSIPHON
45. ROUND-HEADED CHINESE HOUSES
46. ROUND-LEAVED FILAREE
47. SALINE CLOVER
48. SALTMARSH COMMON YELLOWTHROAT
49. SALT-MARSH HARVEST MOUSE
50. SALT-MARSH WANDERING SHREW
51. SAN BRUNO ELFIN BUTTERFLY
52. SAN BRUNO MOUNTAIN MANZANITA
53. SAN FRANCISCO BAY SPINEFLOWER
54. SAN FRANCISCO CAMPION
55. SAN FRANCISCO COLLINSIA
56. SAN FRANCISCO GUMPLANT
57. SAN FRANCISCO LESSINGIA
58. SAN FRANCISCO OWL'S-CLOVER
59. SAN FRANCISCO POPCORN-FLOWER
60. SANTA CRUZ MICROSERIS
61. SANTA CRUZ TARPLANT
62. SERPENTINE BUNCHGRASS
63. SOUTHERN SEA OTTER
64. TIBURON INDIAN PAINTBRUSH
65. TIBURON JEWEL-FLOWER
66. TIDEWATER GOBY
67. TOMALES ISOPOD
68. WESTERN LEATHERWOOD
69. WESTERN POND TURTLE
70. WESTERN SNOWY PLOVER
71. WHITE-RAYED PENTACHAETA
72. WHITE-TAILED KITE

SAN BRUNO MOUNTAIN STATE PARK

N

0 2.25 4.5 Miles

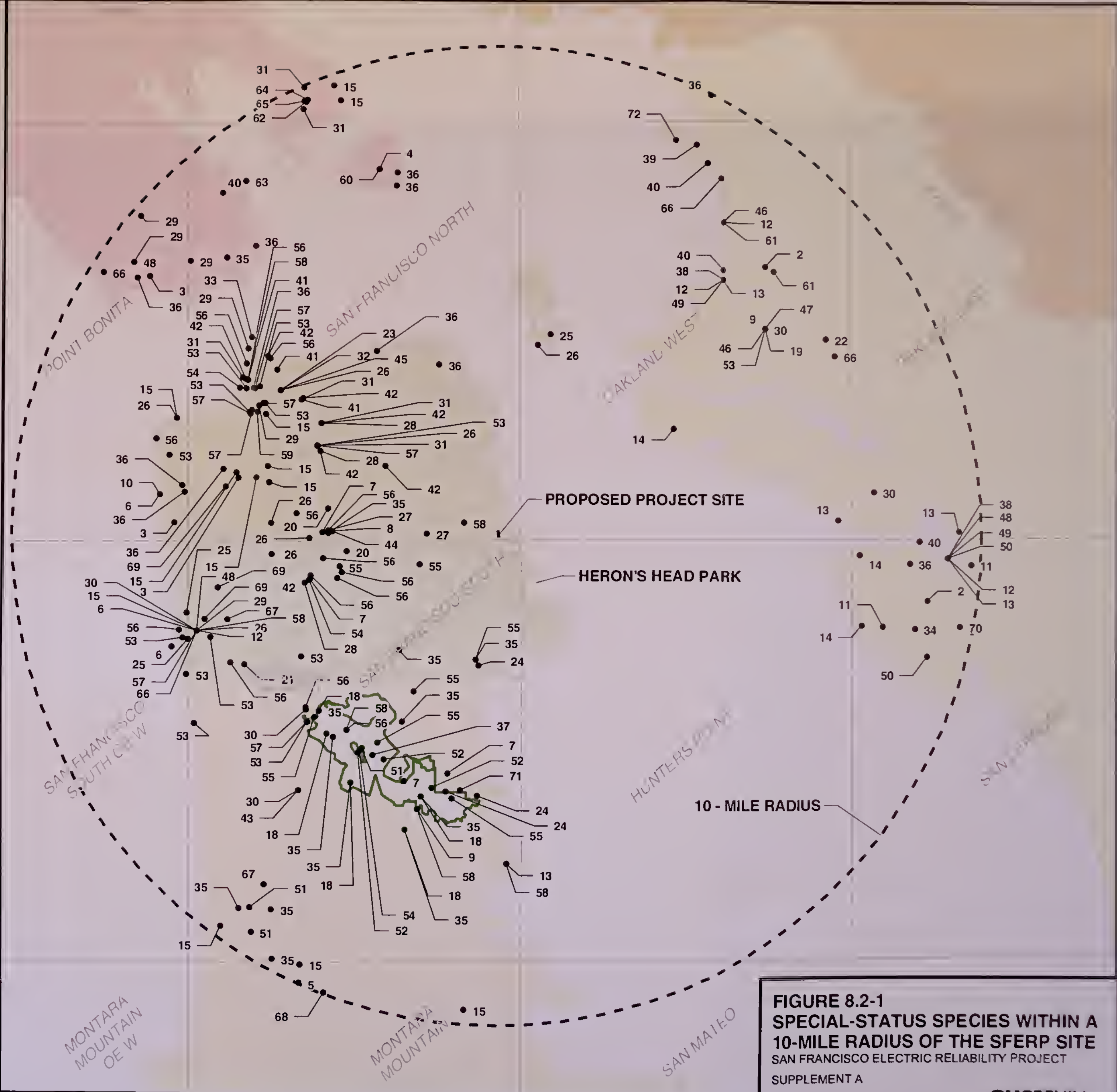
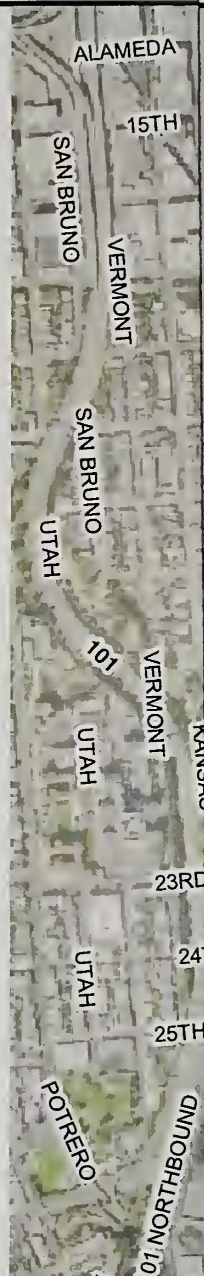


FIGURE 8.2-1
SPECIAL-STATUS SPECIES WITHIN A 10-MILE RADIUS OF THE SFERP SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\SFPUC\MXDS\8_2-1_CNDDB_SUPPLEMENTA.MXD 2/22/2005 12:10:12



LEGEND

- PUMP STATION
- ELECTRIC TRANSMISSION LINE (UNDERGROUND)
- NATURAL GAS SUPPLY LINE
- POTABLE WATER LINE
- PROCESS WATER SUPPLY
- COLLECTION BOX
- SITE LOCATION
- 1-MILE BUFFER

0 1,100 Feet

Source:
1. Base map is from aerial photograph, 2002 from AIRPHOTO, USA.
2. Soil mapping units are from Natural Resource Conservation Servic (NRCS), 1991.

FIGURE 8.2-2
BIOLOGICAL RESOURCES WITHIN PROJECT AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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FIGURE 8.2-2
BIOLOGICAL RESOURCES WITHIN PROJECT AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT SUPPLEMENT A

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SUBSECTION 8.3

Cultural Resources

8.3 Cultural Resources

8.3.1 Introduction

This subsection discusses the environmental setting, consequences, regional and local impacts, and mitigation measures associated with the cultural resource aspects of the San Francisco Electric Reliability Project (SFERP). Subsection 8.3.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to cultural resources. Subsection 8.8.3 describes the environment that may be affected by SFERP construction and operation. Subsection 8.3.4 identifies environmental consequences from development of the power plant and its associated laydown site and water supply pipeline, and Subsection 8.3.5 discusses cumulative impacts. Mitigation measures are discussed in Subsection 8.3.6. Subsection 8.3.7 presents the agencies involved and provides agency contacts. Subsection 8.3.8 presents the required permits and permitting schedule. Subsection 8.3.9 provides references used to prepare this subsection. Resumes of the preparers are provided in Appendix 8.3A.

The SFERP project is located between Cesar Chavez Street and 25th Street in the Potrero District of the City of San Francisco (City). Land use in the vicinity of the proposed SFERP project site is predominantly industrial to the north, south, and west. The laydown site is located immediately east of the project site on a vacant parcel flanked by Maryland, Cesar Chavez and 26th streets. The San Francisco Bay is east of the laydown site. The water supply pipeline is located on Cesar Chavez, Mississippi, and Marin streets (see Figure 1-2). The electrical transmission line runs west from the project site on 25th Street, then north on Michigan, west on 24th, north on Illinois, then east on 22nd to the PG&E Substation and will be constructed in an underground trench. The natural gas pipeline runs west on 25th Street to Illinois Street.

Cultural resources include prehistoric and historic archaeological sites,[1] districts and objects; standing historic structures, buildings, districts and objects; and, locations of important historic events, or sites of traditional/cultural importance to various groups.[2] Primary data sources used to prepare this section include the CEC testimony by Reinoehl and Mason (2002)

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1 Site – "The location of a significant event, a prehistoric or historic occupation or activity, or a building or structure…where the location itself possesses historic, cultural, or archeological value." (USNPS-IRD, 1991:15)

2 The federal definitions of cultural resource, historic property or historic resource, traditional use area, sacred resources are reviewed below and are typically applied to non-federal projects.

A cultural resource may be defined as a phenomenon associated with prehistory, historical events or individuals or extant cultural systems. These include archaeological sites, districts and objects; standing historic structures, districts and objects; locations of important historic events; and, places, objects and living or non-living things that are important to the practice and continuity of traditional cultures. Cultural resources may involve historic properties, traditional use areas and sacred resource areas.

Historic property or historic resource means any prehistoric district, site building, structure or object included in, or eligible for, inclusion in the National Register of Historic Places. The definition also includes artifacts, records and remains that are related to such a district, site, building, structure or object.

Traditional use area refers to an area or landscape identified by a cultural group to be necessary for the perpetuation of the traditional culture. The concept can include areas for the collection of food and non-food resources, occupation sites and ceremonial and/or sacred areas.

Sacred resources applies to traditional sites, places or objects that Native American tribes or groups, or their members, perceive as having religious significance.

who incorporated the results of several documents, including: Mirant (2001a, b), SECAL (2000a-c, 2001a-d), URS/Dames & Moore (2000), and Wirth Associates (1979).

8.3.2 Laws, Ordinances, Regulations, and Standards

Cultural resources are indirectly protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431 et seq.) and subsequent related legislation, policies, and federal agency regulations and guidelines for implementation of the Antiquities Act.

The following laws, ordinances, regulations, standards, and policies apply to the protection of cultural resources in California. Projects licensed by the Energy Commission are reviewed to ensure compliance with these laws. Table 8.3-1 summarizes applicable LORS.

8.3.2.1 Federal

National Historic Preservation Act (NHPA), 16 USC 470, requires federal agencies to take into account the effects of their undertakings on historic properties through consultations beginning at the early stages of project planning. This law is applicable to projects that involve federal property, permits, loans, or other direct federal involvement. Regulations revised in 2004 (36 CFR Part 800 et seq.) set forth procedures to be followed for determining eligibility for nomination, the nomination, and the listing of cultural resources in the National Register of Historic Places (NRHP). The eligibility criteria and the process are used by federal, state, and local agencies to determine significance of cultural resources. Properties that meet the criteria for listing in the NRHP are called historic properties. Very similar criteria and procedures are used by the state in identifying cultural resources eligible for listing in the California Register of Historic Resources. The NHPA does not apply to the SFERP project because there is no federal land or federal permit involved in licensing the project. The law is described here because it is possible that project design changes after licensing could lead to federal permitting and because the NHPA provides a model for California state laws that protect significant cultural resources.

8.3.2.2 State

Public Resources Code, Section 5024.1 establishes a California Register of Historical Resources [CRHR]; sets forth criteria to determine significance; defines eligible properties; and lists nomination procedures.

Public Resources Code, Section 5097.5 states that any unauthorized removal or destruction of archaeologic or paleontologic resources on sites located on public land is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

Public Resources Code, Section 5097.9 prohibits the interference with the free expression of Native American religion as provided in the United States Constitution and the California Constitution; and causing severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine on public property, except on a clear and convincing showing that the public interest and necessity so require.

TABLE 8.3-1
Applicable Cultural Resource Laws, Ordinances, Regulations, and Standards

LORS	Requirements	Applicability
California Public Resources Code Section 5024.1	Establishes California Register of Historical Resources	Yes
California Public Resources Code Section 5097.5/5097.9	Prohibits causing severe or irreparable damage to any Native American sanctified cemetery, place of worship, religious or ceremonial site, or sacred shrine located on public property, except on a clear and convincing showing that the public interest and necessity so require.	Yes
California Public Resources Code Section 5097.98/5097.99	Requires notification to most likely descendants in the event a Native American grave is encountered. Imposes penalties for obtaining or possessing Native American human remains or artifacts.	Yes, if burials are discovered
California Public Resources Code Section 21083.2	Provides that if a lead agency determines that project has significant effect on "unique" archaeological resources the environmental impact report must address those issues.	Yes
California Public Resources Code Section 21084.1	Equates a significant effect on the environment with a substantial adverse change in significance of a historic resource.	Yes
California Administrative Code, Title 14 Section 4307	Prohibits destruction of paleontological, archaeological and historical objects.	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15126.4(b)	Discusses mitigation measures related to historical resources.	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15064.5	Defines "historical resources", determines significance of impacts to archaeological and historical resources.	Yes
CEQA Guidelines, Title 14 Code of Regulations Section 15064.7	Defines "cumulatively significant", describes "thresholds of significance."	Yes
California Penal Code, Section 622.5	Makes it a misdemeanor to willfully damage objects or things of archaeological or historical interest.	Yes
California Health and Safety Code, Section 7050.5	Requires that in the event of discovery of human remains, all excavation must cease until the coroner of the relevant county makes certain findings.	Yes, if burials are discovered
San Francisco Building Code, Chapters 16B and 16C	Requires owners to undertake structural analysis of each unreinforced masonry wall; and to undertake alterations to conform to code or to demolish the structure.	Yes
San Francisco Planning Code, Article 10	Provides for the designation of landmarks and historic districts, and recognition of structures of historic, architectural and aesthetic merit.	Yes, if proper-ties are eligible for landmark designation

Pubic Resources Code, Section 5097.99 prohibits obtaining or possessing Native American artifacts or human remains taken from a grave or cairn and sets penalties for these actions.

Public Resources Code, Section 21083.2 states that if a project may affect a resource that has not met the definition of an historical resource set forth in Section 21084, then the lead agency may determine whether a project may have a significant effect on "unique" archaeological resources; if so, an Environmental Investigation Report (EIR) shall address these resources. If a potential for damage to unique archaeological resources can be demonstrated, such damage must be avoided. If they cannot be avoided, mitigation measures shall be required. The law also discusses excavation as mitigation; discusses the costs of mitigation for several types of projects; sets time frames for excavation; defines "unique and non-unique archaeological resources;" provides for mitigation of unexpected resources; and sets financial limitations for mitigation under the section.

Public Resources Code, Section 21084.1 indicates that a project may have a significant effect on the environment if it causes a substantial adverse change in the significance of a historic resource; the section further defines a "historical resource" and describes what constitutes a "significant" historical resource.

Title 14, California Code of Regulation (CCR) Section 4307 (14 CCR 4307), states that no person shall remove, injure, deface or destroy any object of paleontological, archaeological, or historical interest or value.

CEQA Guidelines, 14 CCR 15126.4, *Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects*, subsection (b) discusses impacts of maintenance, repair, stabilization, restoration, conservation, or reconstruction of a historical resource. Subsection (b) also discusses mitigation through avoidance of damaging effects on any historical resource of an archaeological nature, preferably by preservation in place, or by data recovery through excavation if avoidance or preservation in place is not feasible. Data recovery must be conducted in accordance with an adopted data recovery plan.

CEQA Guidelines, Title 14 CCR 15064.5, *Determining the Significance of Impacts to Archaeological and Historical Resources*. Subsection (a) defines the term "historical resources." Subsection (b) explains when a project may be deemed to have a significant effect on historical resources and defines terms used in describing those situations. Subsection (c) describes CEQA's applicability to archaeological sites and provides a bridge between the application of the terms "historical" resources and a "unique" archaeological resource.

CEQA Guidelines, 14 CCR 15064.7, *Thresholds of Significance*. This section encourages agencies to develop thresholds of significance to be used in determining potential impacts and defines the term "cumulatively significant."

California Penal Code, Section 622.5. This section provides that anyone who willfully damages an object or thing of archaeological or historic interest can be found guilty of a misdemeanor.

California Health and Safety Code, Section 7050.5. If human remains are discovered during construction, the project owner is required to contact the county coroner.

California Public Resources Code, Section 5097.98. If the county coroner determines that the remains are Native American, the coroner is required to contact the Native American

Heritage Commission, which is then required to determine the "Most Likely Descendant" to inspect the burial and to make recommendations for treatment or disposition of the remains and any associated burial items.

8.3.2.2.1 State CEQA Process. CEQA requires a review to determine if a project will have a significant effect on archaeological sites or a property of historic or cultural significance to a community or ethnic group eligible for inclusion in the CRHR (CEQA Guidelines).

CEQA provides that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment (Section 21084.1 of the Public Resources Code). CEQA defines substantial adverse change as demolition, destruction, relocation, or alteration that the significance of a historical resource would be impaired (Section 5020.1). Section 21084.1 stipulates that any resource listed in, or eligible for listing in, the CRHR[3] is presumed to be historically or culturally significant unless the preponderance of evidence demonstrates the contrary.[4]

Resources listed in a local historic register or deemed significant in a historical resource survey (as provided under Section 5024.1g) are presumed to be historically or culturally significant unless the preponderance of evidence demonstrates they are not.

A resource may be historically significant even if it is: 1) not listed in, or determined to be eligible for listing in, the CRHR, 2) not included in a local register of historic resources, and 3) not deemed significant in a historical resource survey (Section 21084.1; see Section 21098.1).

CEQA requires a Lead Agency to identify and examine environmental effects that may result in significant adverse effects. Where a project may adversely affect a unique archaeological resource,[5] Section 21083.2 requires the Lead Agency to treat that effect as a significant environmental effect and prepare an EIR. When an archaeological resource is listed in, or is eligible to be listed in, the CRHR, Section 21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of a project's environmental analysis. Either of these

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3 The California Register of Historical Resources is a listing of "those properties which are to be protected from substantial adverse change." Any resource eligible for listing in the California Register is also to be considered under CEQA.

4 A historical resource may be listed in the California Register of Historical Resources if it meets one or more of the following criteria: "(1) is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; (2) is associated with the lives of persons important to local, California or national history; (3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or, (4) has yielded or has the potential to yield information important in prehistory or history (...of the local area, California or the nation)" (Public Resources Code §§5024.1, Title 14 CCR, Section 4852). Automatic CRHR listings include National Register of Historic Places (NRHP) listed and determined eligible historic properties (either by the Keeper of the NRHP or through a consensus determination on a project review); State Historical Landmarks from number 770 onward; Points of Interest nominated from January 1998 onward. Landmarks prior to 770 and Points of Historical Interest may be listed through an action of the State Historical Resources Commission.

5 Public Resources Code 21083.2 (g) defines a unique archaeological resource to be: An archaeological artifact, object, or site, about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information; (2) has a special and particular quality such as being the oldest of its type or the best available example of its type; or, (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

benchmarks may indicate that a project may potentially have an adverse effect on archaeological resources.

Other state-level requirements for cultural resources management appear in the California Public Resources Code Chapter 1.7, Section 5097.5 (Archaeological, Paleontological, and Historical Sites), and Chapter 1.75, beginning at Section 5097.9 (Native American Historical, Cultural, and Sacred Sites) for lands owned by the state or a state agency.

The disposition of Native American burials is governed by Section 7050.5 of the California Health and Safety Code and Sections 5097.94 and 5097.98 of the Public Resources Code, and falls within the jurisdiction of the Native American Heritage Commission (NAHC).

If human remains are discovered, the San Francisco Medical Examiner (Coroner) must be notified within 48 hours and, until his arrival, there should be no further disturbance to the site where the remains were found. If the remains are determined by the coroner to be Native American, the Coroner is responsible for contacting the NAHC within 24 hours. The NAHC, pursuant to Section 5097.98, will immediately notify those persons it believes to be most likely descended from the deceased Native American so they can inspect the burial site and make recommendations for treatment or disposal.

8.3.2.3 Local

8.3.2.3.1 San Francisco City and County. The San Francisco Building Code, Chapters 16B and 16C, requires owners of unreinforced masonry walls to undertake a structural analysis. If the building does not meet the minimum standards of the code and any exceptions, the owner must structurally alter the building to conform to the code or have the building demolished. San Francisco Planning Code Article 10 provides a mechanism to encourage historic preservation in the case of permits for the alteration or demolition of buildings that are (1) initiated as land marks, (2) designated as land marks, or (3) located within a district that has been designated as a historic district under Article 10. This article allows the City to maintain a list of buildings and structures which have been "officially designated by agencies of the State or federal government."

8.3.3 Affected Environment

The project area is located on the San Francisco Peninsula, a northward extension of the Santa Cruz Mountains that separates San Francisco Bay from the Pacific Ocean. The project area is an industrial area within the City of San Francisco. The project is located on land reclaimed from San Francisco Bay south of Potrero Point on the western shoreline of San Francisco Bay about 1.8 miles south of the Bay Bridge. Potrero Hill rises to an elevation of approximately 300 feet above sea level, one-half mile northwest of the project. The project area is industrial with warehouses to the north and south and the Port of San Francisco Pier 80 shipping complex to the southeast. To the immediate west of the site is an open field to be developed as a MUNI Operations and Maintenance Facility and to the northwest is a residential area at the base of Potrero Hill, known as the Dogpatch Neighborhood.

There are two officially-recognized and eligible historic districts, Dogpatch and Pier 70, both of which are completely within the boundaries of, and are part of, a third, larger historic

district called the Central Waterfront District (CWD).[6] These districts share common historical themes, focusing on the industrial nature of the area, along with the theme of residential and commercial development for local industrial workers and of the City of San Francisco.

The Central Waterfront District, with its embedded Dogpatch and Pier 70 historical areas, contains 243 buildings of CRHR status levels (status codes of 1, 2, 3, 4, 5, 7) in the state historic property file (or CHRIS List) that are individually listed on the NRHP (code 1), determined eligible (code 2), appear to be eligible (code 3), may become eligible (code 4), are eligible for local list only (code 5), or have not been evaluated or whose status is underdetermined (code 7). These include resources that might be contributors either to the larger district or the individual districts. Another 32 buildings have been evaluated as code 6 (determined ineligible or delisted); 29 are 6Z1 (found ineligible with no potential for listing); two are 6Z (found ineligible); and one is 6Y2 (found ineligible by consensus determination but not evaluated for local listing).

8.3.3.1 The San Francisco Electric Reliability Project (SFERP)

The area around the proposed SFERP 145 MW power plant and switchyard—an area about one mile in diameter and roughly bounded by Potrero Hill/I-280 on the west, San Francisco Bay on the east, Islais Creek on the south, and Mariposa Avenue on the north—has been the subject of a number of historic property inventory and evaluation efforts over the past two decades, often focused on areas immediately adjacent to the project site. During the course of these efforts almost every building over 50 years old has been evaluated for its eligibility under criteria of significance and integrity established by the NRHP or CRHR. The result of these surveys is that the historic architectural resources in the area of the project site are well known and understood.

The project site and proposed laydown area (bounded roughly 25th Street on the north, Cesar Chavez Street on the south, the bay on the east, and Michigan Street on the west) were examined as a part of the Central Waterfront District survey and the present project. Since the area is fenced, there was limited access to the site; however, it appears (from the public right-of-way) to have no historic period structures (at least 45 years old). A concrete mixing plant, temporary offices, and containers are currently located on the site. An aerial photograph dated July 1993 shows the area as completely vacant (TerraServer, 2003).

Given the existence of various inventory projects, no additional historic buildings and structures inventory or evaluation was undertaken. Rather, this section addresses the impacts the project may have on the known and existing historical resources on or around the project site as defined under state law and local ordinances. The following section briefly summarizes the history of the project area, discusses the main themes and contexts, describes the resources on the project site and in the project area.

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6 The inventory of the Central Waterfront District was completed in October of 2001 under a grant from the SHPO to the San Francisco Planning Department. It was approved by the San Francisco Planning Commission and is currently under review at the SHPO for its potential to be included in the CRHR. See: San Francisco Planning Department, "Central Waterfront Cultural Resources Survey Summary Report and Draft Context Statement, October 2000 – October 2001." CEC Dockets, 00-AFC-4.

8.3.3.2 Prehistoric Setting

The earliest documented occupation of the area between San Francisco and Monterey bays dates to about 8,000 years before present (BP). Prior to about 2,000 BP, archaeological evidence suggests that this area was occupied by small groups of hunter-gatherers that exploited both terrestrial and marine resources (mostly shellfish). Approximately 2,500 BP, large shellmound sites began to be occupied around San Francisco Bay. These sites were likely habitation sites with dense shell midden, flaked and ground stone tools, bone tools, beads, ornaments, charmstones, and burials. The shellmounds were occupied until the arrival of the Spanish.

The main marine resource used was shellfish, mostly oysters and bentnose clams. The most important upland resource was acorns gathered from oak trees in the fall. Acorn processing (leaching out the tannic acid and grinding into acorn meal) required a significant amount of labor. Use of acorns as early as 2,500 BP indicates intensification of resource procurement at a relatively early period in prehistory in this area. The beginning of the use of the shellmound sites around San Francisco Bay may correspond with the arrival of Utian language speakers from the Sacramento-San Joaquin Delta area. These Utian speakers were the ancestors of the Costanoans who occupied the Bay Area when the Spanish arrived.

8.3.3.3 Ethnographic Background

The project area lies within the territory occupied by the Native American group (known to the Spanish and 20th century ethnographers) as the Costanoan (Figure 8.3-1). The contemporary descendants of this group are members of the Ohlone Indian Tribe. The Costanoan group occupied the coast of California from San Francisco to Monterey and inland to include the coastal mountains from the southern side of the Carquinez Straits to the eastern side of the Salinas River south of Chalone Creek. Costanoan refers to a language family consisting of eight related languages. Each language was spoken by different ethnic groups within their established geographical area. The political units within each ethnic group were tribelets; each tribelet varied from 50 to 500 people with the average being about 200. Each tribelet had one or more permanent villages and several temporary camps within its territory. Hunting and gathering groups lived in temporary camps when securing resources within the tribelet territory away from the village.

The Ramaytush language speakers occupied the project area. It is estimated that some 1,400 speakers were present in 1770. The Ramaytush speakers were divided into at least 10 tribelets. Each tribelet had a chief, a position inherited patrilineally (through the father's side). The chief fed visitors, directed ceremonial activities, organized hunting, fishing, and gathering activities and directed warfare expeditions. The coastal Costanoan traded with the inland Yokuts (mussels, abalone shells, dried abalone meat, and salt for piñon nuts and other inland products). Acorns from four species of oak were the most important plant food. Nuts, berries, seeds, and roots were also important. Costanoan groups practiced controlled burning of the chaparral to encourage sprouting of seed plants and improve deer and elk browse. The most important foods were deer, rabbit, steelhead, salmon, sturgeon, lampreys, oysters and clams.

The Costanoan lived in thatched dome houses with rectangular doorways and a central hearth. Other structures in the villages included sweathouses, dance enclosures, and an assembly house. Technology included tule balsa canoes, bows and arrows, and baskets.

Chipped stone tools were made from chert obtained locally and obsidian obtained in trade with others. Between 1770 and 1797, the Spanish established seven missions in Costanoan territory. Due to introduced European diseases and a declining birth rate, their population decreased from about 10,000 to 2,000 by 1832.

8.3.3.4 Historic Setting

Spanish explorers intent on settling the Pacific Coast first reached the San Francisco Bay in 1769, and by 1776, Juan Bautista de Anza, Jose Joaquin Moraga and Fathers Francisco Palou and Pedro Cambon established the Mission Dolores (San Francisco) and the San Francisco Presidio. Mission Dolores was one of 21 Spanish missions extending from San Diego in the south to the mission San Francisco Solano in Sonoma in the north, all established between 1769 and 1823. The presidio was one of four established by the Spanish prior to 1800. In 1774, a fort was also established at Castillo de San Joaquin, later Fort Point. The early history of California is well documented in many sources, including Rice, et al. (1996) and Hoover, et al. (1990).

The Spanish era ended when Mexico won its independence from Spain in 1821. The missions were secularized by the mid-1830s, and former mission lands were granted to soldiers and other Mexican citizens for use as cattle ranches. Mexicans, Europeans, and Americans came to California to take advantage of the generous land grants of the Mexican government. The end of Spain's imperialist policies led, by the 1830s, to a lively hide and tallow trade between the inland ranches and the settlements in the San Francisco Bay Area. The little cove settlement of Yerba Buena, the forerunner of the City of San Francisco, was founded by Captain William A. Richardson in 1835. As Pacific Coast trade increased through the 1830s and 1840s, the center of activity in the Bay Area was the natural anchorage for trading ships at Yerba Buena. In the summer of 1846, war between Mexico and the US led to the American occupation of San Francisco (see Cole, 1981:13-19 and Hoover, et al., 1990:331-334).

American success in the Mexican-American War in 1848, followed by the Gold Rush of 1849, brought large numbers of Anglo-Americans to San Francisco. As a result, the city experienced many significant changes because it was the seaport nearest the gold fields. San Francisco quickly developed into a shipping and transportation center for a state that was remote and isolated from the rest of the country. Other towns, such as Oakland (incorporated in 1852) and San Jose (which served as the State's first capital in 1849), grew up around the Bay Area. However, San Francisco's growth far outpaced growth in these other areas. Oakland developed more fully after the transcontinental railroad was completed in the Bay Area in 1869. Bay Area towns provided commercial, warehousing, financial, and manufacturing services for the inland mining and agricultural areas of the state (Hoover, et al., 1990:335; Beck and Haase, 1974:30).

In 1847, the local government changed the name of Yerba Buena to San Francisco. As noted, at that time it was a small village fronting a large mud flat and cove that became an instant city in a few short years. Speculators and promoters surveyed a town site in 1847 and began selling lots, some of which were under water. Starting in 1848, the Gold Rush was like a spark that set off a wild rush of development and speculation. Fortune-seekers arrived from all parts of the globe. Sailors abandoned ship to head off for the gold fields. Portions of the Bay and Yerba Buena Cove were filled with the hulks of abandoned ships and other

material to create more land for development. By late 1849 development of the City had spread well beyond the bounds of Yerba Buena Cove onto the surrounding area's flats and hills. Shipping companies built wharves hundreds of yards into the bay during the early 1850s. Wells Fargo, Adams and Company, and the Merchants Exchange established headquarters in San Francisco in 1853, as did other commercial institutions soon thereafter; making the City the center of the State's economic activity. The population of San Francisco reached 57,000 in 1860 (Rice, et al., 1996:221-226; Soule, 1855:301-305, 437-441; and Cole, 1981:43-44).

The City expanded along the waterfront to the south and west from Yerba Buena Cove, which was located on the northeast end of the San Francisco peninsula. The Potrero Point area, where the project area is located, is a small finger of land projecting out into the bay south of the core of San Francisco. The city's industrialists developed it as an early industrial area. This area extended from the waterfront to Potrero Hill, located approximately one mile inland. The area was well located at the southern end of the city, close enough to serve as a convenient industrial location but south of the main portion of the new city. By 1855, heavy industry began locating at Potrero Point. A black powder plant was located at the point because of its isolated location. The explosives industry remained at the point until about 1880, when encroachment by residential areas led to its relocation to other areas (San Francisco Planning Department, 2001).

By the 1880s, the Potrero Point area consisted of a grid of streets sparsely populated with warehouses, docks and industrial complexes, roughly bounded by 16th Street on the north and 26th Street on the south. There were numerous substantial industrial and commercial establishments located at Potrero Point in the vicinity of the waterfront. These included the Pacific Rolling Mills Company, Union Iron Works, and the San Francisco Cordage Factory and Rope Works on the north side of the point, and the California Sugar Refinery and the works of the City Gas Company on the southern end. The California Sugar Refinery was established by Claus Spreckels in 1881, was renamed the Western Sugar Refinery in 1891, and eventually expanded to border Louisiana and Humboldt streets on the east and north and the waterfront on the south and west. North of the California Sugar Refinery was the gas manufacturing plant of the City Gas Company, established at Potrero Point in 1872. The plant was located on blocks bounded by Georgia, Massachusetts, and Humboldt Streets, and its facilities included two 1,038,000-cubic-foot gas storage tanks. Portions of this well-equipped complex survived, and were later incorporated into the PG&E plant built at the site. The industrial and storage works of the California Sugar Refinery, and the City Gas Company plant, were the first major developments to occur in the project location (San Francisco Planning Department, 2001:8-9; Sanborn, 1886-1887, 1900; USGS, 1895, 1899; and Coleman, 1952:28-29).

The Western Sugar Refinery complex at Potrero Point was established to refine and produce sugar made from Hawaiian sugar cane. It eventually became the largest sugar refinery in the western United States. The facility consisted of several multi-story brick buildings that functioned as a refinery, and filter house. The complex also consisted of several brick warehouses, coal bunkers, storage tanks, a sack house, stock corrals, a large storage reservoir, and wharves. A Southern Pacific Railroad spur ran down 23rd street to the wharf. The refinery operated until 1949, when it was purchased by its major competitor, the California and Hawaiian Sugar Refining Corporation (C&H) (Sanborn Fire Insurance Maps, 1900, 1915,

1950; San Francisco Planning Department, 2001:10-11). C&H also had an extensive factory complex with ocean-shipping facilities in Crockett on the Carquinez Straits.

The first decades of the 20th century were a period of rapid expansion in the Bay Area. In the Potrero area, industrialists filled the shallows in the Bay to the south of Potrero Point between 1899 and 1914, and constructed a wharf along the south end of Potrero Point. During the same period the San Francisco Shipyard was constructed on the north end of Potrero Point. The area underwent a period of reconstruction and further expansion after the devastating 1906 earthquake that destroyed many 19th century buildings and structures in San Francisco (USGS, 1899, 1915). Buildings in the gas works and in the sugar complex survived the disaster.

The San Francisco Gas and Electric Company (SFG&E) purchased the City Gas Works Plant at Potrero Point in 1897. Formed from a consolidation of the San Francisco Gas and Light Company and Edison Light and Power Company in 1896, SFG&E had absorbed many smaller competitors by 1901. However, at that time there were other companies competing for customers in a rapidly expanding utility industry, resulting in an intense rate war.

This rate war was illustrated by two competing utility companies with plants at Potrero Point. One of SFG&E's competitors was Claus Spreckels, who, in 1899 and 1901, incorporated the Independent Electric Light and Power Company and Independent Gas and Power Company. In 1901, Spreckels built an electric generating plant adjoining his Western Sugar Refinery at Potrero Point, located south of the SFG&E plant at Potrero. The state-of-the-art plant consisted of a large brick structure that housed a steam-powered electrical generating plant with a 5,000-kilowatt capacity, and had an adjoined gas plant. The plant was constructed on the west side of Louisiana Street, on the site formerly owned by the California Barrel Company. The rate war ensued until 1903, when Spreckels and others sold their works to SFG&E, ending the competition. In 1906, the San Francisco Gas & Electric was renamed Pacific Gas & Electric (PG&E), and the former Spreckels facility at Potrero, which was more modern and up-to-date than the other SFG&E facility at Potrero, became known as Station A. It was one of two power plants in the area that survived the 1906 earthquake and was subsequently expanded as the city was rebuilt. By 1914, the PG&E facility was expanded to the west between Louisiana and Michigan Streets, including the construction of large 1- and 5-million-cubic-foot gas holders. During this year the Meter House was constructed. The plant was also expanded to the south of 23rd Street, with a gas pump and gas holder constructed near the south wharf at Potrero Point (Coleman, 1952:82-91, 236; Sanborn Fire Insurance Maps, 1900, 1914).

PG&E's Station A was the largest steam electric plant west of the Rocky Mountains from 1903 through 1913, and supplied almost all of San Francisco's electricity during this period. In 1924, the Compressor House was constructed on the site. Later, when PG&E developed cheaper hydroelectric power, Station A was used to supplement the hydroelectric power during periods of peak use. PG&E modernized the station's equipment throughout the years, and with the continuing upgrades Station A remained in operation until 1983. The company placed the Potrero gas plant on standby from 1929 to 1960, when much of it was demolished (California Energy Commission, 2002:5.4.7).

Fire insurance maps prepared between 1915 and 1950 show that the south end of Potrero Point was occupied by the PG&E facility and the Western Sugar Refinery (C&H). During

this period Kentucky Street was renamed Third Street. Between 1915 and the early 1940s many of the PG&E and Western Sugar Refinery structures remained at the waterfront between 22nd and 23rd street, but the structures along the south wharf were replaced. By the 1950s, much of the C&H sugary refinery had been removed, and by the mid-1960s, many of the PG&E structures north of Humboldt Street had also been removed (Sanborn Fire Insurance Maps, 1914, 1950; USGS 1915, 1942, 1946, 1947a,b, 1948, 1950, 1956, and 1968; San Francisco Planning Department, 2001:10-11). The dense concentration of industrial buildings on the location of the PG&E and C&H complexes can be seen in several historic photographs included in the CWD report (especially Figure 6, an aerial photograph taken between 1929 and 1934). This image shows the complex of buildings that served the sugar industry east of Station A, all of which have since been removed (San Francisco Planning Department, 2001:14).

8.3.3.5 Potential for Buried Archaeological Resources

The SFERP is located in an area that was formerly part of the Islais Creek Cove on the San Francisco Bay shoreline. In fact, much of the project site route is located in areas that were part of the Bay as late as 1931 (AGS, 1999). Construction of the water supply pipeline will cross areas of fill that are likely to be of low sensitivity for prehistoric and historic archaeological resources, with some exceptions. The electrical transmission line will cross the prehistoric shoreline into areas that are of high sensitivity for prehistoric resources. For these reasons, a brief discussion of the local history of San Francisco Bay fill development is appropriate to foresee in which areas significant buried resources might be found. A similar analysis was conducted on behalf of the Mirant Corporation for its Cooling Tower System Amendment to the Application for Certification, Potrero Power Plant Unit 7 (00-AFC-04), response Staff Data Requests 216 through 220 (Mirant Corporation, 2003). Figure 8.3-2 shows the pipeline route in relation to the prehistoric shoreline and other features.

The history of land use and Bay filling in the area provides some clues to the kinds of buried cultural resources that might be present. This account closely follows the historic context statement for the Central Waterfront District historic resources survey report and the Dogpatch Historic District context statement (San Francisco Planning Department, 2001; VerPlanck, 2001).

The Potrero Point area was first occupied by industry about 1854, when the E.I. duPont deNemours Company constructed a black powder magazine to the northwest of the SFERP site. At this time, Potrero Point was a rocky peninsula located between Mission Bay to the north and the Islais Creek Cove to the south. One year later, the Hazard Powder Company constructed a similar facility along what was at that time the southern shore of Potrero Point (near what is now 23rd Street). Powder was in great demand for mining and general construction uses. Later both companies constructed wharves for loading the powder onto ships. By 1881, both companies had sold their interests to the Claus Spreckels sugar company, due to the increasing encroachment of residential areas.

Another early industry in the Potrero Point area was the San Francisco Cordage Manufactory, later called Tubbs Cordage Company. Established in 1857, the company made ropes, largely for marine and mining purposes. For many years, Tubbs Cordage was a major area employer, although the company gradually declined before closure in 1962. Tubbs was located northwest of the SFERP site, along 3rd (Kentucky) Street, between 22nd and 23rd

streets. One very interesting feature of the Tubbs operation was the Tubbs Cordage rope walk, as depicted in the Sanborn Insurance Maps for 1899 (Sanborn Inc., 1900). The rope walk was a long (at first, 1,000 feet, later 1,500 feet), covered walkway that extended out into the Bay on piers. It was used by the cordage workers as they twisted fiber strands together to make long ropes. The rope walk ran in a southeastern direction from the cordage plant, crossing into the Bay from 3rd Street north of 23rd Street. In doing so, it crossed the location of the SFERP underground electrical transmission line along what is now 23rd Street near Illinois Street (see Figure 8.3-2).

Another important local early development was the construction of the Potrero, Hunters Point, and Bay View (P&BV) Railroad and its bridges, the Long Bridge and 3rd Street Trestle. The Long Bridge was a rail trestle constructed across Mission Bay in 1867 and the 3rd Street Trestle crossed Islais Creek Cove a year later (U.S. Coastal Survey, 1869). The railway was constructed as a north-south connector between downtown San Francisco and the Bay View area, and was double-tracked for two-way horse-drawn trolleys. The railroads that constructed the P&BV line and the bridges (Southern Pacific and Atchison, Topeka, and Santa Fe), acquired real estate rights to adjacent lands on the condition that they fill Mission Bay and the Islais Creek Cove to make industrial land. The filling of Islais Cove was delayed; however, until after the turn of the century. The SFERP process water pipeline crosses the 3rd Street trestle alignment at right angles on Cesar Chavez Street. By 1899, Cesar Chavez Street (then Army Street) extended eastward to meet the trestle in the Bay. It is not clear whether the Army Street connector was created on fill or on a trestle. The trends in bay fill are shown on early topographic maps (U.S. Coastal Survey, 1869; U.S. Geological Survey, 1896, 1896, 1915a, 1915b, 1942, 1947; Sanborn Inc., 1900).

By 1915, the Western Pacific Railway had constructed a spur that extended the 25th Street alignment east to the 3rd Street trestle and beyond it to a jetty along what is now 25th Street. Though Mission Bay had been filled by this time and the 3rd Street rail corridor had been widened, the former Islais Creek Cove was still unfilled.

8.3.3.6 Resources Inventory

A California Historic Resources Information System records search (NWIC 03-548) was conducted on February 3, 2004 for the original project site to check for recorded resources. A second record search was conducted for the new project site on January 26, 2005.

Previous investigations for the Mirant Potrero Unit 7 Project (00-AFC-4) (Wirth Associates 1979) did not identify any archaeological resources in the SFERP project area, but concluded that there was a low to moderate potential for buried prehistoric resources and a moderate to high potential for buried historic resources. Several industrial buildings more than 50 years old were identified in the project vicinity, mostly located west of Third Street. The I.M. Scott School, built in 1895 and located at 1060 Tennessee Street, is San Francisco Historical Landmark 138 (SECAL, 2000c).

In 2002 the San Francisco Department of Planning conducted a cultural resources survey of the Central Waterfront (which included the proposed project site) sponsored by the State Office of Historic Preservation (see San Francisco Planning Commission, 2001). The survey was accepted by the San Francisco Planning Commission and forwarded to the State Office of Historic Preservation to review the eligibility of the District for listing in the CRHR. The

CWD report recommended that "at the very minimum, the Central Waterfront area's historic resources should be given special consideration" in local land use planning (San Francisco Planning Commission, 2001:10, 27).

CHRIS records search NWIC 03-548 revealed no recorded archaeological resources in the SFERP project area. A prehistoric archaeological site, CA-SFR-15 (P-38-000015) is recorded approximately 0.5 miles south of Marin Street (which is the terminus of the proposed water supply pipeline). A historic resource (P-38-004274) is located just south of CA-SFR-15 (and is approximately 0.6 miles south of Marin Street). Resource P-38-004274 is the Islais Creek Sewage Treatment Plant, which was recommended by its recorder as NRHP Status Code 3S (eligible under Criterion C for design qualities at the local and regional levels of significance) (Kelley, 2002). No resources are recorded on or adjacent to the project site or construction laydown site.

The 2005 CHRIS records search (NWIC 04-687) revealed no newly recorded cultural resources located within or near the project site, laydown area, or linear facilities. Based on historic maps and aerial photographs, the project site was reclaimed from Islais Creek Cove of San Francisco Bay sometime between 1931 and 1942. Filling began to the northwest of the project site approximately 1931, when the Western Pacific Ferry slip was constructed at 25th and Delaware Streets (AGS, 1999). Sometime after 1935, Western Pacific filled the northern half of the property for a railyard serving the ferry terminal. This yard included extensive trackage across the project site, and served as a switchyard for ferried freight cars. Maps of the 1940s (USGS 1942, 1946, 1947, 1948) show a series of railroad tracks along the current 25th Street alignment, expanding to cover the northern third or so of the project site by 1947. The site assessment conducted for the San Francisco Municipal Railway system (AGS, 1999) interprets maps and aerial photographs as indicating a possible storage shed area just to east of the southern part of the project site, a machine shop and maintenance area to the west, and "general track" on the north end of the parcel, with a possible engine house or maintenance building at the north (25th Street) end of the parcel. Also according to this study, the remainder of the fill that is in place today in the project area north of the Islais Creek channel was placed there between 1955 and 1966, as Cesar Chavez (then Army) Street was extended for construction of the Port of San Francisco Pier 80 terminal.

8.3.3.6.1 Field Surveys. Previous geotechnical studies for the former PG&E Potrero project provide some insights regarding the potential for encountering submerged buried cultural resources in the bay. Eucalyptus fragments found in a geotechnical boring at a depth of 9 to 23 feet suggest the presence of a wood pile at the location. Small wood fragments were found in 8 of the 31 sediment samples. No other historical material was recovered. The eucalyptus wood pile and small wood fragments were interpreted as representing remnants of the East Wharf/Sugar Dock associated with the Western Sugar Refinery. The wharf was the only structure built in the water in the Potrero project area and was demolished sometime between 1950 and 1975. The eucalyptus wood pile may have supported the wharf. The small wood fragments probably represent remnants of the wharf material deposited on the bayfloor after demolition (SECAL, 2000c). It is not likely that historical material dating prior to the 20th century exists on the bay floor in the project area. This area was probably dredged in order to accommodate large ships carrying sugar that moored at the East Wharf. Vessels over 400 feet in length are shown moored at the East Wharf of the Western Sugar Refinery in photos dating to the 1930s and 1940s (SECAL, 2000c).

Archaeological field surveys were conducted for the original (23rd Street) SFERP project site and laydown area in 2004. Additional field surveys of the new site, the underground transmission alignment, natural gas pipeline route, and water supply pipelines (Process and Potable) were conducted on February 21, 2005. The water supply pipelines, electrical transmission line and natural gas pipeline will be installed in trenches within the existing street network, and the process water supply pipeline will enter an existing concrete utility box within Cesar Chavez Street. Native soils underlying these streets are covered by pavement and so were not directly inspected during the survey.

The project site consists of three sections. The northern third of the site is covered by the Pacific Cement Corporation concrete batch plant. At the time of survey, the ground surface in this area was covered entirely by cement and gravel processing equipment, gravel, rock, and cement piles, concrete paving, and water. There do not appear to be remnants of the railroad track or railroad maintenance shed in this area. The central third of the site is vacant, and used for storage of a few large concrete pilings. Ground visibility in this area was excellent on the day of survey. This section is covered in sandy fill with some gravel, rock, concrete, and brick rubble inclusions that are apparently part of the site fill. The southern third of the site is covered in gravel and the ground is not visible. There is a construction trailer on site, apparently associated with development of the adjacent Municipal Railway parcel to the west. Other than the trailer and a very recent area used for testing concrete and other pavement treatments, this section of the parcel was vacant at the time of survey. There were no indications of the previous uses as a railroad yard or of railroad storage or maintenance on the project parcel and no other artifacts or features potentially older than 50 years were identified there.

8.3.3.6.2 Resources on the Project Site. There are no archaeological or historical resources located on or adjacent to the project site. The site lies on land that was reclaimed from San Francisco Bay early in the twentieth century, so there will be no buried in situ prehistoric archaeological resources located there. There are no standing structures at the project site and are no archaeological resources of the historic era on the site surface.

8.3.3.6.3 Resources on the Laydown Site. There are no previously recorded archaeological sites standing buildings or structures on the laydown site. The laydown site lies on land that was reclaimed from San Francisco Bay in the early decades of the 20th century.

8.3.3.6.4 Resources along the Water Pipeline Corridor. There are no previously recorded archaeological sites or standing buildings or structures within the proposed Process water pipeline corridor. A portion of the pipeline is routed within a concrete pipe collection box and along existing streets and will not encroach upon existing buildings or structures that flank the affected streets. Like the laydown site, much of the proposed Process and Potable Water pipeline route lies on land that was reclaimed from San Francisco Bay in the early decades of the 20th century. The western most portion of the proposed pipeline route (Marin and Mississippi Streets) appears to correspond to former bayshore or upland that once surrounded the saltwater wetlands associated with Islais Creek in the late 19th century (USGS, 1896). The western portion of the proposed pipeline route may be an area of high probability for the presence of prehistoric archaeological resources. However, the pipeline will be contained within an existing collection box from Cesar Chavez and Indiana streets to its terminus at Marin Street (see Figure 2-1). The CHRIS records search conducted on

January 26, 2005 revealed that the closest recorded archaeological site (CA-SFR-15) is located about 0.5 miles south of the southern terminus of the water pipeline at Marin Street.

8.3.3.6.5 Resources along the Electrical Transmission Corridor. There are no previously recorded archaeological sites and no standing buildings or structures within the proposed electrical transmission line corridor. The transmission line will be placed underground in portions of 25th, Michigan, 24th, 22nd, and Illinois Streets. From the project site, this line runs in bay fill, crossing into the prehistoric shoreline area along Illinois near Humboldt Street.

8.3.3.6.6 Resources outside the Project Site that May Be Subject to Indirect Impacts. As noted above, the area within the general boundaries of the Central Waterfront District (CWD) (which includes within its boundaries the Dogpatch and Pier 70 districts) has been thoroughly inventoried and, in most cases, its resources 50 years old or older have been evaluated. The CWD inventories included recording and evaluation of two building complexes that are located on lots adjacent to the project parcel. These are the complex of buildings that occupy the large, developed area between Michigan and Maryland streets (east-west) and between 24th and 25th Streets (north-south) immediately north of the project parcel and the two warehouses located on Cesar Chavez Street south of the project parcel.

The large complex of buildings and industrial utility yards north of the project site is known as the Eaton and Smith Plant (1215-1275 Michigan Street) or the Sheedy Drayage Company Plant, according to the CWD site record (Kelley, 2001). There are several shops and warehouses located on the property, and a truck parking shed. The buildings were constructed by General Contractor Eaton and Smith during the 1950s. The CWD survey concluded that the property does not have particular cultural or historic value and is not eligible for listing in the California Register of Historical Resources.

There are two standing structures near the project site that were included in the CWD inventory. These are the two warehouses at 800 Cesar Chavez Street (a.k.a. 640 Army Street, APN 4310-003), just south of the project parcel. One building is a large steel-frame warehouse with corrugated metal panel walls, consisting of two parallel gables. The warehouse was constructed in 1952 by Western Pacific Railroad Company as an industrial development and was first occupied by the Moore Dry Dock Company, according to the CWD site record (Kelley, 2001). The second building is a small warehouse built in 1975 for the Burns Draying Company and used for vehicle maintenance. The CWD survey concluded that these buildings do not have distinctive cultural or historical value and are not eligible for listing in the California Register of Historical Resources.

8.3.3.6.7 Native American Contacts. SECAL/Mirant contacted the Native American Heritage Commission (NAHC) to obtain a list of concerned Native Americans living in the San Francisco Area. SECAL/Mirant sent letters to the Native Americans describing the project and asked about concerns. No responses were received. CH2M HILL also contacted the NAHC in December 2003, and received a list of concerned Native Americans. Letters were also sent to the listed Native Americans. No responses have been received through January 29, 2005 (Appendix 8.3C).

8.3.4 Environmental Consequences

This subsection assesses the potential environmental impacts of the project on cultural resources. Laws governing the treatment of cultural resources require the Energy Commission to categorize resources by determining whether they meet several sets of specified criteria. These categories then in turn influence the analysis of potential impacts (environmental consequences) to the resources and the mitigation that may be required to ameliorate any such impacts.

8.3.4.1 Significance Criteria

Under federal law, only historical or prehistoric sites, objects, or features, or architectural resources that are determined by a qualified researcher to be "important" or "significant" in accordance with federal guidelines need to be assessed for potential impacts. The significance of historical and prehistoric cultural resources is judged in accordance with the criteria for eligibility for nomination to the National Register of Historic Places (NRHP) as defined in 36 CFR 60.4. If such resources are determined to be significant, and therefore eligible for listing in the NRHP, as well as the California Register, they are afforded certain consideration under the National Historic Preservation Act and/or CEQA. The federal laws are not applicable to the SFERP project at this time because there is no known federal nexus.

The NRHP criteria state that "eligible historic properties" are: districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that (a) are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or (d) that have yielded, or may be likely to yield, information important to history or prehistory. Isolated finds by definition do not meet these criteria.

Under federal law, resources determined not to be significant, that is, not eligible for NRHP listing, are subject to recording and documentation only, and are afforded no further protection. However, occasionally certain resources, although they may not be assessed as "significant," may nonetheless be of local or regional importance such that mitigation may be warranted regardless of their assessed significance. Energy Commission staff evaluates the survey reports and site records for any known resources located within or adjacent to the project area potential effects (APE) to determine whether they meet the eligibility criteria.

CEQA Guidelines now explicitly require the lead agency (the Energy Commission) to make a determination of whether a proposed project will affect "historical resources." The guidelines provide a definition for historical resources and set forth a listing of criteria for the California Register of Historical Resources (CRHR). These are essentially the same as the eligibility criteria of the NRHP. In addition, as with the NRHP, historical resources must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. If the criteria are met and the resource is determined eligible for the CRHR, the Energy Commission must evaluate whether the project will cause a "substantial adverse change in the significance of the historical resource."

CEQA also contains a section addressing "unique" archaeological resources and provides a definition of such resources (Public Resources Code, Section 21083.2). This section

establishes limitations on analysis and prohibits imposition of mitigation measures for impacts to archaeological resources that are not unique. However, the CEQA Guidelines state that the limitations in this section do not apply when an archaeological resource has already met the definition of a historical resource (14 CCR 15064.5).

8.3.4.2 Potential Environmental Impacts to Historic Properties

8.3.4.2.1 Power Plant Site. There are no known cultural resources at the project site, so the project would not cause any impacts to historic properties there. The project would, furthermore, not cause adverse indirect impacts to cultural resources located on adjacent properties because buildings and structures on adjacent parcels have been evaluated and it has been determined that they do not meet the criteria for listing in the California Register of Historical Resources.

8.3.4.2.2 Laydown Site. The construction laydown site is vacant land that has been reclaimed from San Francisco Bay in past decades. All laydown operations will rest on existing graded/graveled surfaces. No subsurface ground alteration will take place; therefore, there would be no possibility that laydown operations could disturb any buried historic archaeological resources (if any are present). A CHRIS records search initiated January 26, 2005 is provided as confidential Appendix 8.3D.

8.3.4.2.3 Water Supply Pipelines, Underground Transmission Line, and Natural Gas Pipeline Corridors. As currently configured, the process water supply pipeline will be constructed within a concrete collection box or along the shoulder of existing city streets (Cesar Chavez Street, Mississippi Street and part of Marin Street) (see Figure 8.3-1). Similarly the underground electrical transmission line will run in Michigan, 24th, 22nd, and Illinois Streets; and the natural gas pipeline, in 25th Street. Construction confined within the existing city streets will not affect the historic built environment. The potable water supply pipeline will be a trenched pipeline that will exit the project site on the southeastern corner, running due south to Cesar Chavez Street.

Pipelines or underground transmission line construction could affect historic or prehistoric archaeological resources that may be present beneath the city streets. Because the street grid pattern in this area has been stable since the end of the 19th century, construction in the existing streets is not expected to encounter historic building foundations. The potential exists, however, for construction to encounter historic debris that pre-dates the original paving of these streets (either by paving stones or by asphalt). The potential also exists for construction to encounter buried prehistoric archaeological resources, if any are present along the streets that now cover the Islais Creek locale (Marin, Mississippi and Cesar Chavez Streets), or in the prehistoric shoreline area along the underground transmission line in Illinois Street. This is discussed in greater detail below.

8.3.4.3 Potential Environmental Impacts to Subsurface Archeological Resources

Given the history of land filling to reclaim lands from San Francisco Bay in the project area (see Subsection 8.3.3.5), there are several general statements that we can make regarding the likelihood of discovering different kinds of buried archaeological or historic resources during excavation for the process water pipeline.

1. Buried prehistoric Native American resources are likely to be found in the former shoreline areas. Prehistoric shoreline and marsh-edge site types such as special extraction camps, fishing camps, and shell midden mounds are very likely to occur in these areas. The underground transmission line route crosses into the prehistoric shoreline zone north of the SFERP site between 22nd and 23rd Streets on Illinois Street. The process water supply pipeline route does not approach the shoreline, since it enters the utility collection box on Cesar Chavez Street at Indiana, which is within the Islais Creek Cove fill area.
2. Remnants of the 3rd Street trestle may possibly be located where Cesar Chavez Street crosses 3rd. However, Wirth Associates (1979) excavated a 12-foot-deep trench in the area of 23rd and 3rd, and did not find remnants of the trestle or of the Tubbs Cordage rope walk.
3. The entire gas pipeline and water supply pipeline routes, and much of the electrical transmission line route run through bay fill. It is possible, though unlikely, that buried boats, ships, or wharves could be encountered during excavations in these areas. The electrical transmission route crosses the former location of the Tubbs Cordage rope walk just north of 23rd Street. The U.S. Coastal Service map for 1869, shows a long wharf extending eastward into Islais Creek Cove in the vicinity of 25th Street, and this same route was later taken by the Western Pacific Railroad for its jetty, extending beyond 3rd Street along the natural gas pipeline route.
4. The pipeline route along Cesar Chavez Street west of 3rd Street was either trestle or fill by 1899. It is thus possible that excavations here will encounter trestle pilings.

8.3.5 Cumulative Impacts

Impacts to subsurface archaeological resources from the proposed project and other projects in the vicinity could occur. However, project proponents for this and future projects in the area can mitigate impacts to as yet undiscovered subsurface archaeological sites by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated as significant (eligible for the CRHR or NRHP).

8.3.6 Mitigation Measures

The City will retain a qualified archaeologist to monitor during construction at the plant site and along the water supply pipelines, natural gas pipeline, and underground electrical transmission line corridors. Monitoring of the laydown site is not required because there will be no subsurface disturbance of the laydown site. If archaeological material is observed by the monitoring archaeologist, ground disturbing activity will be halted in the vicinity of the find so that its significance (CRHR eligibility) can be determined. If evaluated as significant, mitigation measures (avoidance or data recovery) will be developed in consultation with the CEC. A worker education program will be undertaken to ensure that buried archaeological resources are recognized by construction crews. Such a program will include information about the kinds of archaeological material that could be encountered and the procedures to be followed if such material is discovered.

8.3.7 Involved Agencies and Agency Contacts

Table 8.3-2 provides a list of agencies and contact persons of potentially responsible agencies.

TABLE 8.3-2
Agencies and Agency Contacts for SFERP Cultural Resources

Agency	Contact/Title	Phone Number	Address
California Office of Historic Preservation	Milford Wayne Donaldson, State Historic Preservation Officer	916-653-6624	1416 Ninth Street, Sacramento, Room 1442
City of San Francisco	N. Moses Corrette, San Francisco Planning Department	415-558-6295	1660 Mission Street San Francisco
Port of San Francisco	Mark Paes, Planner Port of San Francisco	415-705-8674	Pier 1 San Francisco
Native American Heritage Commission	Larry Myers, Executive Secretary	916-653-4082	915 Capitol Mall, Sacramento

8.3.8 Permits and Permitting Schedule

Permits dealing with the effects on cultural resources are addressed as part of the building permit process.

8.3.9 References

AGS, Inc. 1999. Final Site Characterization/Corrective Measure Study and Article 22A Soil Characterization Report, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway. Prepared for San Francisco Municipal Railway, City and County of San Francisco, San Francisco, California.

Beck, W.A. and Y.D. Haase. 1974. *Historical Atlas of California.* Norman, University of Oklahoma Press.

California Energy Commission. 2002. *Potrero Power Plant Unit 7 Project Final Staff Assessment, February 13, 2002*. Sacramento.

Cole, T. 1981. *A Short History of San Francisco.* San Francisco, Lexikos.

Coleman, C.E. 1952. *PG & E of California: The Centennial Story of Pacific Gas and Electric Company, 1852-1952*. New York, McGraw-Hill.

Hoover, M.B., et. al. 1990. *Historic Spots in California.* Stanford, Stanford University Press.

Kelley, T.J. 2001. Department of Parks and Recreation Form DPR-543A, 800 Cesar Chavez Street. Department of Parks and Recreation Form DPR-543A, 1215-1275 Michigan Street, Central Waterfront Survey Advisory Committee. July 20.

Kelley, T.J. 2002. *Primary Record Form P-38-004274 – Islais Creek Sewage Treatment Plant.* Primary Record Form on file, California Historical Resources Information System, Sonoma State University, Rohnert Park.

Mirant Corporation. 2001a. Mirant 2001 D Res 4. *Southern Energy California response to staff Data Requests, Set 4, Nos. 170 through 194, Potrero Power Plant Unit 7 Project (00-AFC-4).* Submitted to California Energy Commission March 27.

Mirant Corporation. 2001b. Mirant 2001 D Res CBE, *Mirant responses to Communities for a Better Environment, Data Requests, Nos. 1 through 113, Potrero Power Plant Unit Project (00-AFC-4).* Submitted to California Energy Commission April.

Mirant Corporation, 2003. Response to California Energy Commission Staff Data Requests, Set 6, (Cultural Resources) Nos. 216 through 220, Cooling Tower System Amendment to the Potrero Power Plant Unit 7 Project (00-AFC-4). Submitted to California Energy Commission, September 11.

Reinoehl, G. and R. Mason. 2002. *Cultural Resources, Testimony of Gary Reinoehl and Roger Mason.* California Energy Commission Final Staff Report, February 13.

Rice, R.B., et. al. 1996. *The Elusive Eden: A New History of California.* New York, McGraw-Hill.

Sanborn, Inc. 1886-1887. *Fire Insurance Maps* (of the City of San Francisco). Sanborn Insurance Company.

Sanborn, Inc. 1900. *Fire Insurance Maps* (of the City of San Francisco). Sanborn Insurance Company.

Sanborn, Inc. 1914. *Fire Insurance Maps* (of the City of San Francisco). Sanborn Insurance Company.

Sanborn, Inc. 1915. *Fire Insurance Maps* (of the City of San Francisco). Sanborn Insurance Company.

Sanborn, Inc. 1950. *Fire Insurance Maps* (of the City of San Francisco). Sanborn Insurance Company.

San Francisco Planning Department. 2001. *Central Waterfront Cultural Resources Survey Summary Report and Draft Context Statement, October 2000 – October 2001.* 8. CEC Dockets, 00-AFC-4.

SECAL (Southern Energy California). 2000a. *Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4).* Submitted to the California Energy Commission, May 31.

SECAL (Southern Energy California). 2000b. *SEP 2000 D Res 1. Southern Energy California response to staff Data Requests, Set 1, Nos. 1 through 139, Potrero Power Plant Unit 7 Project (00-AFC-4).* Submitted to California Energy Commission, December 7.

SECAL (Southern Energy California). 2000c. *SEP 2000 D Res 2. Southern Energy California response to staff Data Requests, Set 2, Nos. 140 through 161, Potrero Power Plant Unit 7 Project (00-AFC-4).* Submitted to California Energy Commission, December 21.

SECAL (Southern Energy California). 2001a. *Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Addresses data responses to staff's Data Requests 30-32 (Cultural Resources), revises AFC Section 8.3, Cultural Resources, and AFC Appendix R, Cultural Resources.* Submitted to the California Energy Commission, January 31.

SECAL (Southern Energy California). 2001b. *Appendix R1. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Appendix R1, Historic Resources Report: Southern Waterfront, San Francisco, California.* Submitted to California Energy Commission, January 31.

SECAL (Southern Energy California). 2001c. *Appendix R2. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Appendix R2, Draft Historic Architecture Report: Station A Potrero Power Plant in the City and County of San Francisco.* Submitted to California Energy Commission, January 31.

SECAL (Southern Energy California). 2001d. *Appendix R3. Amendment to the Application for Certification, Potrero Power Plant Unit 7 Project (00-AFC-4). Appendix R3, Historic Architecture Report: 435 23rd Street, City and County of San Francisco.* Submitted to California Energy Commission, January 31.

Soule, F. 1855. *The Annals of Scan Francisco.* New York. Appelton and Company.

TerraServer. 2003. http://terraserver-usa.com/printimage.aspx?T=1&S=10&X=2771&Y=20892&Z=10&P=San+Francisco%2c+California%2c+United+States&D=10+Jul+1993, accessed December 20.

URS/Dames & Moore. 2000. *Potrero Power Plant Unit 7 Project: Research Design for Limited Subsurface Archaeological Investigations (Confidential).* Submitted to Southern Energy Potrero, December 5.

U.S. Coastal Survey. 1869. *San Francisco Peninsula, North Point to Visitacion Point.*

USGS. 1895. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1896. *San Mateo, California, 15 minute quadrangle map.* United States Geological Survey.

USGS. 1899. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1915a. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1915b. San Mateo, California, *15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1942. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1946. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1947a. *San Francisco, 15 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1947b. *San Francisco North, 7.5 minute quadrangle map.* United States Geological Survey, Washington, D.C.

USGS. 1948. *San Francisco, 15 minute quadrangle map*. United States Geological Survey, Washington, D.C.

USGS. 1950. *San Francisco North, 7.5 minute quadrangle map*. United States Geological Survey, Washington, D.C.

USGS. 1956. *San Francisco North, 7.5 minute quadrangle map*. United States Geological Survey, Washington, D.C.

USGS. 1968. *San Francisco North, 7.5 minute quadrangle map*. United States Geological Survey, Washington, D.C.

VerPlanck, Christopher. 2001. Context Statement, Dogpatch Historic District Resource Survey. Appendix D in San Francisco Planning Department.

Wirth Associates, Inc. 1979. *Potrero 7: Phase II, Archaeological Test Excavations. Prepared for Pacific Gas & Electric Company*. Report S-14074 on file, Northwest Information Center, California Historical Resources Information System, Sonoma State University, Rohnert Park.

FIGURE 8.3-1
AREAS OF ETHNOGRAPHIC OCCUPATION IN THE VICINITY OF SFERP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

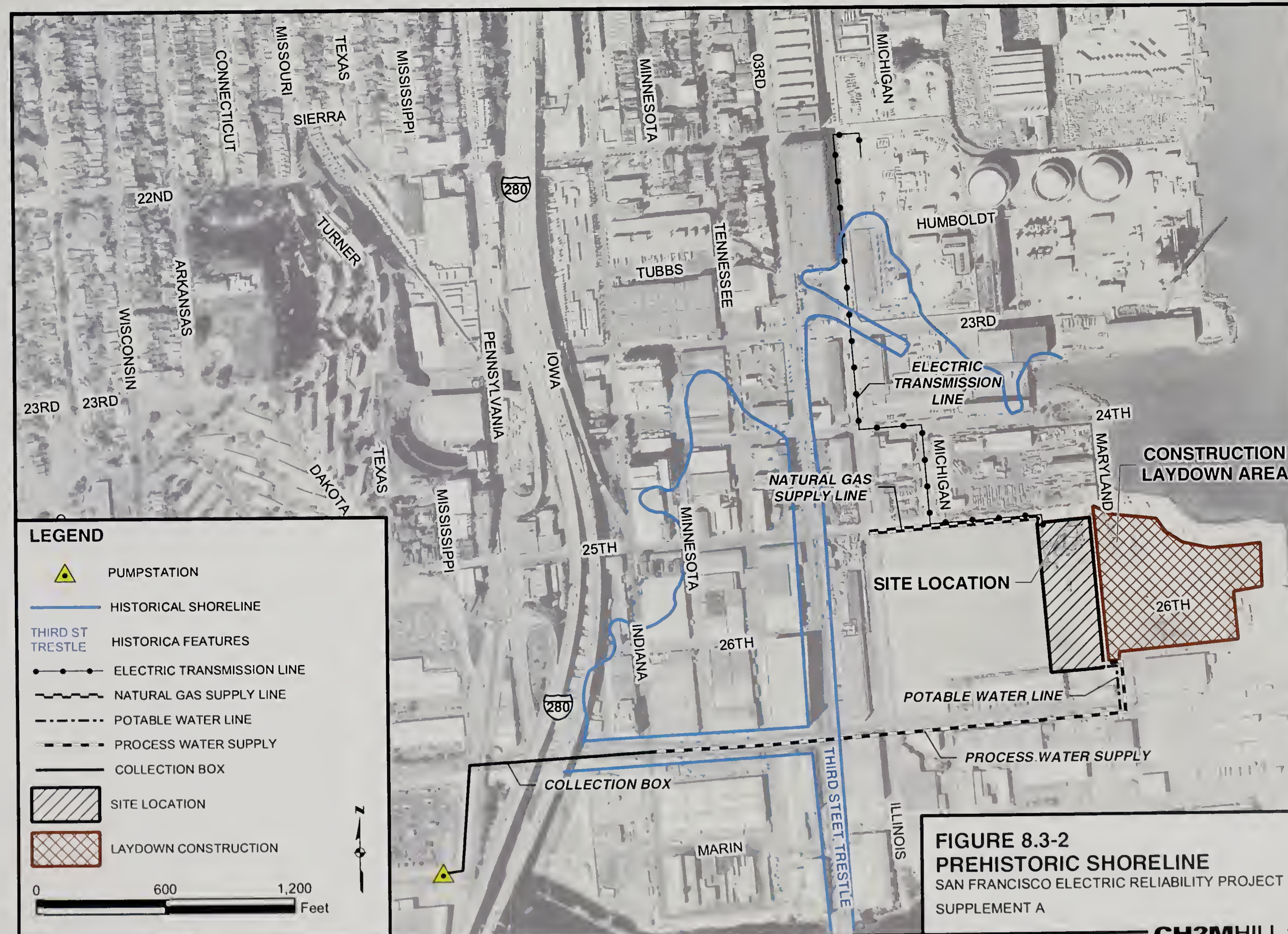

FIGURE 8.3-2
PREHISTORIC SHORELINE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

RDD \\RDD40004508\RDDGIS\SFPUC\MXDS\8_3-2_HISTORIC_SHORELINE_SUPPLEMENTAMXD.MXD 2/28/2005 13:56:00

SUBSECTION 8.4

Land Use

8.4 Land Use

8.4.1 Introduction

This section provides an inventory of existing and planned land uses in the vicinity of the proposed San Francisco Electric Reliability Project (SFERP) facilities. For purposes of this analysis, the affected environment (study area) is defined as those areas within one mile of the proposed SFERP site and within 0.25 mile of the proposed offsite linear facilities. The overview of the project's affected environment includes a description of existing land uses and zoning districts in the project study area. An analysis of the potential impacts on land uses surrounding the proposed project is provided. This section also evaluates the project's consistency with land use plans and policies, including adopted local, regional, state, and federal plans applicable to the proposed project.

Land use trends identified for the study area are based on current land use plans and approved development projects. Reasonably foreseeable future development projects are assessed for potential cumulative land use impacts. Where appropriate, mitigation measures are proposed to reduce potential project-related land use impacts to acceptable levels.

Land use impacts associated with the proposed SFERP are identified and evaluated based on:

- Site reconnaissance surveys
- A review of current U.S. Geological Survey (USGS) 7.5-minute topographic (i.e., quadrangle) maps
- Aerial photography
- A review of local land use ordinances
- A review of the land use goals and policies identified in the San Francisco General Plan (General Plan) and associated Area Plans and maps
- Future land use development trends
- Discussions with City planners

Other local plans reviewed for this assessment include plans adopted by the Bay Conservation and Development Commission (BCDC), the Port of San Francisco, and the Metropolitan Transportation Commission (MTC).

8.4.2 Affected Environment

The affected environment of the project is defined in accordance with the requirements of the California Energy Commission (CEC). The affected land use environment/study area includes, but is not limited to, the area within a one-mile radius of the proposed SFERP facilities and one-quarter mile surrounding the proposed offsite facilities. The one-mile radius surrounding the SFERP site encompasses the 0.25-mile area surrounding all proposed linear facilities. Government agencies with land use jurisdiction in the study area include the City, the San Francisco Redevelopment Agency, BCDC, and the Port of

San Francisco. Figure 8.4-1 shows jurisdictional boundaries within the project study area. (Figures are located at the end of this subsection.)

8.4.2.1 Regional Setting

San Francisco County is one of nine counties that comprise the San Francisco Bay Area. The City and County of San Francisco (CCSF) are contiguous jurisdictions encompassing an area approximately 8 miles across from east to west and 5 to 7 miles across from north to south. Surrounding counties include Marin to the north, Alameda to the east, and San Mateo to the south. The Pacific Ocean and San Francisco Bay bound San Francisco to the north, east, and west. Most of San Francisco is heavily urbanized, with small pockets of open-space areas preserved as parks.

The project is situated within Potrero Point along the eastern shoreline of the San Francisco Bay between Central Basin in the north and Islais Creek Channel in the south. This area is referred to as the Central Waterfront and is dominated by industrial land uses. Residential and commercial uses are located farther west of the industrial band of land uses along the waterfront. The existing Potrero Power Plant is located approximately 0.3 mile north of the SFERP site. SBC Park is located approximately 1.8 miles north of the SFERP site, and the Hunters Point Power Plant is approximately 1.7 miles to the south.

8.4.2.2 Existing Land Uses and Zoning

The proposed SFERP site encompasses approximately 4 acres owned by the City of San Francisco. The project site does not include any permanent structures. However, a temporary concrete batch plant occupies the northern portion of the project site. The area immediately east of the project site, within the proposed staging area, is currently used as trailer storage for a trucking operation.

The project site is surrounded by industrial land uses. These include a cement facility directly north of the site, various industrial land uses along Cesar Chavez Street south of the site, and shipping facilities east of the site along the waterfront of the San Francisco Bay. The land directly west of the project site is currently vacant. However, the San Francisco Municipal Railway (MUNI) is planning to construct a light-rail maintenance-and-operations facility at this site.

As shown on Figure 8.4-2, the majority of land uses within the one-mile study area are industrial. Within 1,500 feet north, south, and west of the project site, existing development is predominantly industrial. Land uses east of the project site include the San Francisco Bay and shipping facilities along the waterfront. Islais Creek is located approximately 1,000 feet south of the project site. The Potrero Power Plant and electrical substation are located approximately 0.3 mile north of the SFERP site at 23rd Street and Illinois Street. Typical land use in the vicinity of the SFERP site includes shipping piers and dry dock facilities, vehicle storage and impoundment yards, gas stations, warehouses, factories, small commercial businesses, a railroad yard, and trucking companies.

Nonindustrial land uses are mainly located at the outer portions of the study area. Residential, retail/commercial, and public land uses (e.g., parks/open space and institutional uses such as schools, churches and libraries) are located at least 0.25 mile from the project site, with the exception of Warm Water Cove park located 705 feet north of the

project site, and a church on Cesar Chavez Street located 474 feet south. Various worker lofts are located throughout the study area, including the nearby vicinity of the project site. The nearest dwelling units are located approximately 1,600 feet west of the project site near Minnesota Street and 25th Street. There are no agricultural land uses within the affected environment.

Zoning districts in the study area are shown on Figure 8.4-3, and generally correlate to existing land uses. A description of each zoning district located in the study area is provided on Table 8.4-1. The project site falls within the Heavy Industry (M-2) zoning district.

TABLE 8.4-1
Zoning Districts Within the Study Area

Zoning District	Description*
Heavy Industry (M-2)	Areas suitable for heavy industrial uses. Uses in the M-2 District are limited primarily to larger industries dependent upon rail and water transportation and by large utility lines. Allowable uses include manufacturing, wholesale, storage, retail, repair, and service uses. Permitted uses include utility installations and steam power plants. Residential uses are conditional uses requiring authorization by the Planning Commission.
Light Industry (M-1)	Areas suitable for light industrial uses. Uses in the M-1 District are primarily limited to smaller industrial uses dependent upon truck traffic. Allowable uses include manufacturing, wholesale, storage, retail, repair, and service uses. Residential uses are conditional uses requiring authorization by the Planning Commission.
Neighborhood Commercial Cluster District (NC-1)	Areas suitable for neighborhood-oriented commercial services that provide convenience retail goods and services for the immediately surrounding neighborhoods primarily during daytime hours. Allowable uses include retail sales and services, and medical professional, and business services. However, commercial uses and features that could impact residential livability are prohibited, such as auto uses, financial services, general advertising signs, drive-up facilities, hotels, and late-night activity; eating and drinking establishments are restricted, depending upon the intensity of such uses in nearby commercial districts.
Small-Scale Neighborhood Commercial (NC-2)	Areas suitable for neighborhood-oriented commercial services. Allowable uses include retail sales and services, and medical professional, and business services. Other uses, including residential, are conditional uses requiring authorization by the Planning Commission.
Moderate Scale Neighborhood Commercial District (NC-3)	Areas suitable for neighborhood-oriented commercial services that provide specialty goods and services to a population greater than the immediate neighborhood. Allowable uses include eating and drinking, entertainment, financial service, and certain auto uses. Other retail businesses, personal services, and offices are permitted at all stories of new buildings. Limited storage and administrative service activities are permitted with some restrictions.
Public Use District (P)	Applies to land owned by a governmental agency and that is in some form of public use, including open space. Permitted uses include structures and uses of the City subject to certain restrictions, and to structures and uses of other governmental agencies not subject to regulation by the Planning Code.
Residential, House Districts, One-Family (RH-1)	Areas suitable for residential areas. Primary uses include one detached residential unit per lot, plus residential care and child care facilities, some open space, and nonindustrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.
Residential, House Districts, Two-Family (RH-2)	Areas suitable for residential areas. Primary uses include two detached residential units per lot, plus residential care and child care facilities, some open space, and nonindustrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.

TABLE 8.4-1
Zoning Districts Within the Study Area

Zoning District	Description*
Residential, House Districts, Three-Family (RH-3)	Areas suitable for residential areas. Primary uses include three detached residential units per lot, plus residential care and child care facilities, some open space, and nonindustrial public space. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.
Residential, Mixed Districts, Low Density (RM-1)	Areas suitable for residential areas. Primary uses include one detached residential unit per lot, and a significant number of apartment buildings. Shopping facilities and transit lines may be found within a short distance of these districts. Nonresidential uses are often present to provide for the needs of residents. Additional uses consistent with residential uses are conditional uses requiring authorization by the Planning Commission.
Residential, Mixed Districts, Moderate Density (RM-2)	These districts are generally similar to RM-1 Districts, but the overall density of units is greater and the mixture of building types and unit sizes is more pronounced. Where nonresidential uses are present, they tend to offer services for wider areas than in RM-1 Districts.

Source: CCSF, 1999.
* Reference to "compatible" uses within the descriptions is based on the zoning requirements.

Planned land uses in the near vicinity of the project site are limited to the M-2 zoning district. As noted above, this district allows for a variety heavy industrial uses, including steam power plants and utility installations. As noted in Table 8.4-1, residential development is a conditional use within both M-1 and M-2 zoning districts, requiring approval from the City Planning Commission.

Recent development within the study area includes 63 housing units located primarily west of Third Street and north of the project site. In addition, a significant commercial structure was recently completed at Cesar Chavez Street and Third Street (Rubin, 2003).

8.4.2.3 Potentially Sensitive Land Uses

Potentially sensitive land uses in the study area include schools, parks, churches, libraries, and residences. These uses are mapped on Figure 8.4-4 and listed on Table 8.4-2. Residential uses are shown on Figure 8.4-2. Additional sensitive land uses within a 3-mile radius from the project site are described in Section 8.6, Public Health and Section 8.12, Hazardous Materials.

The nearest sensitive land use is a church located 474 feet southwest of the project site on Cesar Chavez Street near Michigan Street. The closest dwelling units to the project site are located approximately 1,600 feet west of the project site near Minnesota Street and 25th Street. The nearest recreational use is Warm Water Cove, located approximately 705 feet north of the project site. As summarized on Table 8.4-2, non-residential sensitive land uses in the SFERP study area include 9 schools, 11 churches, 6 parks, 3 senior centers, and one library.

TABLE 8.4-2
Potentially Sensitive Land Uses within the Affected Area

Land Use[a]	Approximate Distance from Proposed Project Site[b]
CHURCH	
1 – Bayview Tabernacle Baptist Church	5,084 feet
2 – Bethel Temple United Holy Church	5,133 feet
3 – First Russian Christian Moloka	4,911 feet
4 – House of God in San Francisco	5,262 feet
5 – New Beginning Church of God	5,080 feet
6 – Pathfinders Mission Baptist Church	4,288 feet
7 – St. James Baptist Church	4,461 feet
8 – St. John Missionary Baptist	4,457 feet
9 – St. Stephen Baptist Church	2,364 feet
10 – St. Teresa's Church	4,720 feet
11 – Supreme Master Ching Hai International	474 feet
LIBRARY	
12 – Potrero Branch Library	4,624 feet
PARKS	
13 – Youngblood Coleman Playground	4,596 feet
14 – Islais Creek Public Access Area	1,721 feet
15 – Heron's Head Park	4,959 feet
16 – Warm Water Cove Public Access Area	705 feet
17 – Esprit Park	3,620 feet
18 – Potrero Hill Playground	4,228 feet
SCHOOLS/DAYCARE	
19 – Angel Childcare for Infants	4,247 feet
20 – Cleo Wallace Child Growth Center	3,528 feet
21 – Daniel Webster Elementary School	4,630 feet
22 – Karen's Family Day Care	4,615 feet
23 – Rise Institute	3,023 feet
24 – San Francisco City College	3,321 feet
25 – San Francisco Head Start	4,946 feet
26 – Applied Science and Technology School	3,702 feet
27 – Starr King Elementary School	2,844 feet

TABLE 8.4-2
Potentially Sensitive Land Uses within the Affected Area

Land Use[a]	Approximate Distance from Proposed Project Site[b]
SENIOR CENTERS	
28 – Bayview Hunters Point Senior Center	2,230 feet
29 – Network for Elders	3,435 feet
30 – Mission Bay Convalescent Hospital	4,649 feet

Notes:
[a] Does not include residential land uses (refer to Figure 8.4-2).
[b] The affected environment consists of the area within one mile (1,760 yards) of the generating plant site and within a quarter-mile (440 yards) of linear facilities.

Sensitive land uses can also include cultural and historical sites as well as natural scenic areas. See Subsection 8.3, Cultural Resources and Subsection 8.11, Visual Resources for assessments of these environmental areas.

8.4.2.4 Land Use Plans and Policies

The project site is located within the City of San Francisco. Land use plans adopted by San Francisco and applicable to the proposed project include the General Plan, the Central Waterfront Area Plan, a component of the General Plan, and the South Bayshore Area Plan. The Central Waterfront Better Neighborhood Plan, a separate plan developed for the Central Waterfront Area, encompasses approximately 500 acres and includes the SFERP project site. A draft of this plan was distributed for public review in January 2003, but has not been adopted by the City. South of the SFERP site, planning for the Bayview Hunters Point Redevelopment and Rezoning Project is in progress, which includes three redevelopment project areas totaling 1,721 acres. Linear SFERP features extend into the planning area of this project.

The following plans do not directly apply to the project site, but apply to land uses within the project study area:

- Port of San Francisco Waterfront Land Use Plan, Waterfront Design and Access Element
- San Francisco Bay Plan (by BCDC)
- San Francisco Bay Area Seaport Plan (by MTC and BCDC)

Land use plans applicable to the proposed SFERP are discussed in the sections that follow. Specific goals, policies, or objectives applicable to the SFERP are discussed under Subsection 8.4.3 (Laws, Ordinance, Regulations, and Standards) and summarized in Table 8.4-3.

TABLE 8.4-3
Land Use Plans and Policies Related to the Proposed Project

Authority Category	Policy*
San Francisco General Plan Commerce and Industry, Environmental Protection, Urban Design, and Air Quality Elements	
Environmental Protection	Assure that all new development meets strict environmental quality standards and recognizes human needs. Promote the use and development of shoreline areas consistent with the Comprehensive Plan and the best interest of San Francisco. Comply with objectives, policies, and air quality standards of the Bay Area Air Quality Management District.
Growth	Encourage development that provides substantial net benefits and minimizes undesirable consequences. Locate commercial and industrial activities according to a generalized Commercial and Industrial Density Plan map.
Open Space	Assure that new development adjacent to the shoreline capitalizes on its unique waterfront location, considers shoreline land use provisions, improves visual and physical access to the water, and conforms with urban design policies.
Urban Design	Promote harmony on the visual relationships and transitions between new and older buildings. Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.
Community Safety	Assure that new construction meets current structural and life safety standards. Consider information about geologic hazards whenever City decisions that will influence land use, building density, building configurations, or infrastructure are made.
Central Waterfront Area Plan	
Land Use	Encourage the intensification and expansion of industrial uses (Policy 1). Prevent the conversion of land needed for industrial activity to nonindustrial use (Policy 2). Assure that the adverse environmental impacts of new development are fully mitigated (Policy 3).
Industry	Promote industrial expansion through maximizing and intensifying the use of existing facilities and properties (Policy 1).
Islais Creek Subarea	Retain and expand industrial uses in the Islais Creek Area (Objective 21). Expand Maritime Activity and ancillary services (Objective 19).
South Bayshore Area Plan	
Land Use	Restrict industrial activities with significant environmental hazards from locating adjacent to or nearby existing residential areas (Policy 1.2). Encourage a wider variety of light industrial uses in South Basin by more efficient use of industrial space (Policy 1.5).

TABLE 8.4-3
Land Use Plans and Policies Related to the Proposed Project

Authority Category	Policy*
Open Space	Maintain the quality of existing shoreline open space (Policy 13.2). Provide new public open spaces along the shoreline—at Islais Creek and India Basin (Policy 13.4).
Industry	Maintain industrial zones in the Northern Industrial Sub-district (Policy 8.1).

Sources: CCSF, 1988, 1997, and 1998.
Note:
* Plans and policies are summarized as relevant to the SFERP project.

8.4.2.4.1 General Plan. The San Francisco General Plan identifies goals and policies regarding industrial development, and contains a more detailed area plan for the Central Waterfront that encompasses the SFERP site. The General Plan includes specific policies to preserve and enhance existing development and to provide for orderly and appropriate new development to meet the needs of the area over the coming years (CCSF, 1996). The General Plan includes the following elements:

- Air quality
- Arts
- Commerce and industry
- Community facilities
- Community safety
- Environmental protection
- Recreation and open space
- Residence
- Transportation
- Urban design

Each element contains goals, policies, and implementation measures pertinent to proposed developments at the project site and within the project study area. Those applicable to the SFERP are summarized in Table 8.4-3.

8.4.2.4.2 Central Waterfront Area Plan. The Central Waterfront Area Plan is a component of the General Plan and provides additional goals and policies applicable to the project site and study area. The plan encompasses approximately 900 acres or 1.4 square miles of eastern San Francisco shoreline between China Basin in the north, Islais Creek in the south, and adjacent inland areas. The existing Potrero Power Plant and SFERP are located in the Central Basin Subarea of the Central Waterfront Area Plan.

The goal of this plan is to reverse the pattern of economic decline in the area by promoting land use objectives to retain and expand industrial and maritime activities. In addition, the plan promotes ancillary development, such as residential, recreational, commercial, and public service infrastructure, that are aligned with the industrial and maritime development goal. Conversely, it discourages developments that do not support the industrial and maritime development goal. Specific objectives applicable to the Islais Creek Subarea encompassing the project site are to retain and expand industrial uses (Objective 21) and expand Maritime

Activity and ancillary services (Objective 19). Additional planning policies applicable to the SFERP are summarized in Table 8.4-3.

8.4.2.4.3 South Bayshore Area Plan. This plan is a tool for residents and the City to guide the future development of the South Bayshore district of San Francisco, which includes the area south of Cesar Chavez Street and east of Highway 101. South Bayshore, commonly known as Bayview Hunters Point, is a predominantly industrial and residential district. The plan includes policies and objectives related to Land Use, Transportation, Housing, Commerce, Industry, Recreation and Open Space, Urban Design, Community Facilities and Services, and Public Safety. The proposed process water pump station and a portion of the proposed process water pipeline to the SFERP are located within the Northern Industrial Sub-district of the South Bayshore Area Plan.

The principal objectives for land use in the South Bayshore are to "achieve favorable balance among residential, industrial, commercial and open space uses; stimulate development in underused and declining areas; protect low scale physical character; and increase pedestrian-oriented neighborhood commercial and social activities." Other policies and objectives of the South Bayshore Area Plan applicable to the project site and study area are provided on Table 8.4-3.

8.4.2.4.4 Central Waterfront Better Neighborhood Plan (Draft for Public Review). The draft Central Waterfront Better Neighborhood Plan (CCSF, 2003) encompasses approximately 350 acres along San Francisco's eastern shoreline, and includes the project site. The planning area is bounded to the north by Mariposa Street, to the west by Interstate 280 (I-280), to the south by Islais Creek and to the east by San Francisco Bay. The draft plan was released for public review and comment in January 2003 and has not been formally adopted by the City. A final Environmental Impact Report for this plan is expected in December 2005.

The plan includes an objective to "Strengthen and expand the Central Waterfront as a residential, mixed use neighborhood." Policy 2.11 of the plan acknowledges that the area adjacent to the existing power plant is not compatible with residential development and would prohibit residential development adjacent to the power plant, if adopted. The plan recognizes the potential for additional housing east of Illinois Street (i.e., at and in the near vicinity of the project site), but recognizes the conflict that would occur due to existing industrial operations at the Potrero Power Plant site. The Central Waterfront Better Neighborhood Plan notes the significant potential for residential development in this area should operations at the Potrero Power Plant site cease. The plan encourages the construction of more than 1,500 additional residential units in the area.

8.4.2.4.5 Bayview Hunters Point Redevelopment and Rezoning Project (Draft). This project is located in the vicinity referred to as Bayview Hunters Point within an area generally bounded by Cesar Chavez Street to the north, US 101 to the west, San Mateo County to the south, and San Francisco Bay to the east. The project involves the adoption or amendment of three redevelopment plans encompassing 1,721 acres. Implementation of this project involves rezoning in Bayview Hunters Point along with a series of community redevelopment programs to address economic development, affordable housing, and community enhancement. Approval of the project would authorize the San Francisco Redevelopment Agency to correct or alleviate physical and economic blighting conditions by facilitating urban infill and rehabilitation programs for private and public properties in

Bayview Hunters Point. The draft Environmental Impact Report (EIR) for the Bayview Hunters Point Redevelopment and Rezoning Project was distributed for public review and comment in October 2004.

8.4.3 Laws, Ordinances, Regulations, and Standards

A summary of the applicable laws, ordinances, regulations, plans, and standards related to land use at the project site and vicinity are summarized here.

8.4.3.1 Federal

No federal LORS for land use apply to the site or project.

8.4.3.2 State

The Application for Certification (AFC) process under the Warren-Alquist Act has been determined to be California Environmental Quality Act (CEQA)-equivalent. It thus fulfills the requirements of CEQA. CEQA is codified in the California Public Resources Code, Sections 21000-21178.1. Guidelines for implementation of CEQA are codified in the California Code of Regulations (CCR) Sections 15000-15387.

8.4.3.3 Local

At the local level, pertinent regulations involve primarily land use policies, zoning requirements, and building and grading standards. In addition, various resolutions and ordinances enacted by the San Francisco Board of Supervisors and Planning Commission are applicable to the proposed SFERP.

8.4.3.3.1 Planning Policies. The San Francisco General Plan and Area Plan policies applicable to the proposed project are listed in Table 8.4-3. In summary, these policies strive to maintain or enhance the quality of life for San Francisco residents while providing the needed services and minimizing potentially associated negative effects. Zoning and other regulations and actions must be consistent with planning policies and goals outlined in the General Plan and Area Plans.

8.4.3.3.2 Resolutions, Ordinances, and Related Permits. Implementation of the General Plan occurs primarily via the San Francisco Planning Code and Zoning Maps. The Planning Code provides detailed specifications for allowable development (e.g., density, lot size, height, setback). The zoning maps delineate the various zones. The project site is located in an area zoned M-2, which provides for heavy industrial uses. Steam power plants and utility installations are permitted uses in areas zoned Heavy Industry, provided that operating requirements necessitate location within that district (CCSF, 1999).

In addition to regulating land use types, the San Francisco Planning Code also regulates the intensity of development in each zoning district. A floor area ratio (FAR) of 5.0 to 1 is permitted in zones designated Heavy Industry. The project site is in a 40-X height and bulk district. This allows structures to be built to a height of 40 feet and with an unlimited bulk. Section 260(b) of the Planning Code exempts structures and equipment necessary for industrial plants and public utilities where such structures and equipment do not contain separate floors (CCSF, 1999).

The final design of the SFERP is required to conform with Article 1.2 of the City Planning Code, which relates to lot coverage. In addition, adequate employee parking is required per Article 1.5 of the Planning Code. Signs at the site during both construction and operation are required to conform to Article 6 of the City Sign Ordinance.

Other regulations governing development include the ordinances and resolutions enacted by the San Francisco Board of Supervisors and Planning Commission. The applicable ordinances and resolutions are summarized in Table 8.4-4. Section 4.0, Environmental Justice, and Subsection 8.1, Air Quality, discuss consistency with additional ordinances and resolutions including ordinance No. 124-01.

TABLE 8.4-4
Applicable Land Use Laws, Ordinances, Regulations, and Standards

Jurisdiction	AFC Section	Authority	Administering Agency	Requirements and Compliance
Federal	8.4.3.1	None applicable		
State	8.4.6.3.2	Cal Pub. Res. Code § 25523(a); 20 CCR §§ 1752, 1752.5, 2300-2309, and Chapter 2, Subchapter 5, Appendix B, Part (i)(3) and (4)	CEC	Evaluate compatibility of the proposed project with relevant land use plans.
	8.4.7	CEQA, Pub. Res. Code §§ 21000-21177	CEC	Appropriate mitigation measures for potential environmental impacts.
Local	8.4.6.3.1 8.4.6.3.2	General Plan	San Francisco Department of Planning	Compliance with goals and policies, and specific zoning requirements.
	8.4.6.3.1 8.4.6.3.2	Central Waterfront Area Plan	San Francisco Department of Planning	Consistent with goals and policies.
	8.4.8	Public Works Code, Articles 2.44, 18	San Francisco Department of Public Works Bureau of Street-Use and Mapping	A Minor Encroachment Permit will be obtained for shoring during construction; a Street Improvement Permit will be obtained for repairs following excavation.
	8.4.6.3.2	San Francisco Charter Section 4.105 and Administrative Code Section 2A.53 (General Plan Referrals)	San Francisco Planning Department and Board of Supervisors	Requires review for conformity with the General Plan from the Planning Department for most projects that require action by the Board of Supervisors. Projects found to be inconsistent with the General Plan cannot be approved by the Board of Supervisors without a two-thirds majority.
Industry		None applicable		

8.4.4 Land Use Trends

According to the Association of Bay Area Governments (ABAG), San Francisco's population is projected to remain relatively stable, growing by an estimated one percent by 2020 (ABAG, 2005). However, the population of eastern San Francisco is expected to increase at a greater rate

during this period due to availability of additional housing units anticipated in the Mission Bay and Hunters Point Redevelopment areas (Lee, 2000). Adoption of the Central Waterfront Neighborhood Plan would result in the development of approximately 1,500 dwelling units in the study area. South of the SFERP study area, the draft Bayview Hunters Point Redevelopment and Rezoning Project plans for a net increase of 3,700 dwelling units. Additional planned development in eastern San Francisco includes the Rincon Point/South Beach Redevelopment project. This redevelopment projects is located north of the SFERP study area.

On March 2, 2004, the citizens of San Francisco rejected a ballot initiative (Proposition J) that would have (1) allowed for the construction of up to 10,000 residential units in downtown San Francisco and the Central Waterfront area and (2) required the San Francisco Planning Department to ensure that there is sufficient land for at least 5,000 additional housing units in the Central Waterfront area. Although Proposition J was defeated, it is evidence of significant interest by some policy makers to facilitate additional affordable residential housing in the City with a particular focus on the Central Waterfront area.

8.4.5 Recent Discretionary Reviews

Based on communication with the San Francisco Planning staff (Rubin, 2005), applications for 398 housing units have been recently approved or are pending approval. Figure 8.4-5 shows those housing units within the study area. In addition, applications for various commercial projects comprising several hundred thousand square feet of new development are also pending or have been approved by the City.

North of the project site, new development is planned at Pier 70 by the Port of San Francisco. The goal of this plan is to rehabilitate and adaptively use the existing historic buildings onsite. The Port intends to provide public-oriented uses at Pier 70, anchored by an institutional tenant such as a government agency or nonprofit organization (Paez, 2004).

South of the project site, the Port has several projects planned or under construction (Beaupre, 2005).

- A multi-modal bridge over Islais Creek will commence construction in March 2005. Construction will last for 18 months. The bridge will link Illinois Street in the north and Cargo Way in the south, and will provide access for rail, truck traffic, and bicyclists.
- Two concrete/cement batch plants are being constructed south of Islais Creek on Pier 92 and 94. Both plants are expected to be operational by summer 2005.
- The Pier 90-94 Backlands is a 44-acre site in the initial planning phase for a distribution and warehouse complex. Upon successful completion of planning and feasibility studies, the Port plans to issue a development RFP to invite development proposals for the site.

8.4.6 Environmental Consequences

This section discusses the environmental consequences of the proposed SFERP related to land use impacts within the project study area. The potential environmental consequences concern both the construction and the operation of the power plant and associated linear facilities.

8.4.6.1 Significance Criteria

Significance criteria for impacts to land use were determined through review of applicable State and local regulations. Because the Warren-Alquist Act is equivalent to a CEQA review, the following criteria developed from the CEQA Guidelines and the CEQA Checklist were used to evaluate the potential environmental impacts of the project:

- Will the project physically divide an established community?
- Will the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?
- Will the project conflict with any applicable habitat conservation plan or natural community conservation plan?
- Will the project result in noise and odor nuisances that will cause existing land uses to cease or be adversely affected, or inhibit the development of future planned land uses?
- Will the project generate traffic problems that will restrict access, adversely affecting land uses?

8.4.6.2 Construction Impacts

Prior to construction, temporary concrete batch plant facilities currently located onsite would be relocated. In addition, the truck trailers stored at the laydown area would also be moved. Due to the portability and temporary nature of these operations, this is not considered a significant land use impact.

Construction of the SFERP will occur adjacent to industrial land uses. Due to the nature of operations at these uses and associated environmental conditions (e.g., high noise and traffic levels), no impact to nearby or adjacent land uses is expected to result from construction activities.

Construction activities would result in noise, dust, equipment exhaust emissions, and other nuisances that could affect sensitive land uses in the study area. However, the distance between the project site and the most sensitive land uses in the study area would provide a sufficient buffer such that existing activities at these uses would not be interrupted by construction activity. Moreover, the City will implement dust-reduction methods as described in Subsection 8.9, Agriculture and Soils. Any impact resulting from noise, dust, and exhaust emissions during construction would be temporary and of a limited degree. Therefore, sensitive land uses within the project study area are not anticipated to be significantly impacted by project construction activities. Additional detail regarding potential noise and air quality impacts during construction activities is provided in Subsection 8.1, Air Quality and Subsection 8.5, Noise.

Material and equipment staging areas will be required during the construction period, which will serve as base stations for employees, field office locations, lay down areas as well as for the storage of materials, equipment, and vehicles. Construction staging is proposed on the adjacent 8.5-acre site located immediately east of the project site (see Figure 8.4-1). This site is surrounded by industrial land uses; construction-related activities at the staging area are not expected to impact operations at adjacent or nearby land uses.

The delivery of construction materials and equipment, and transport of personnel will generate traffic that could temporarily impede access to study area land uses. Based on the anticipated volume of construction traffic (refer to Subsection 8.10, Traffic and Transportation), access to surrounding land uses would be maintained such that existing activities and operations would be uninterrupted or substantially maintained. Therefore, no significant land use impact is anticipated to result from construction-related traffic.

Construction of the project's linear facilities will require excavating portions of local roadways, and could temporarily restrict vehicle and pedestrian access to adjacent land uses. If necessary, detours and alternate routes would be provided to maintain access to study area land uses. These issues would be addressed as a component of the project's traffic management plan. Any restriction of access to existing land uses would be temporary, and would not result in a significant impact to adjacent land uses. Traffic impacts associated with construction activities are assessed in detail under Subsection 8.10, Traffic and Transportation.

8.4.6.3 Operational Impacts

The SFERP facilities are sited on a 4-acre parcel within an area dominated by heavy industrial uses. Selection of the SFERP site was due in part to the existing heavy industry in the area as well as the availability of nearby gas and electrical transmission infrastructure. Due to the industrial character of the immediately surrounding areas, no impact to adjacent and nearby industrial operations is anticipated to result from project implementation. Potential conflicts or compatibility impacts with existing and proposed land uses in the one-mile study area are discussed in the following subsection, followed by an assessment of the project's consistency with land use plans, policies and regulations.

8.4.6.3.1 Compatibility with Existing and Proposed Land Uses. Existing operations at the project site include a concrete batch plant. Trucking facilities are located on the adjacent property to the west, at the site of the construction staging area. Pier 80 facilities to load and unload trucks are directly to the south. Project implementation would change the current land use at the site. However, subsequent to implementation of the SFERP, noise, odors, and traffic would be similar in degree to those associated with industrial operations at the existing concrete batch and trucking operations. Visual characteristics at the site would be the most prominent alteration (refer to Section 8.11, Visual Resources for further detail). However, the change in the visual environment would not affect surrounding industrial operations. Potential impacts related to the use and handling of hazardous materials during operation of the SFERP are discussed under Section 8.12, Hazardous Materials.

Existing land uses adjacent to or within 1,500 feet of the project site primarily involve heavy industry. A MUNI light-rail maintenance-and-operations facility is planned for construction immediately west of the project site. Operation of the SFERP would not interfere with the continuing operation of industrial land uses in the project study area, including the planned MUNI facility. No impact to surrounding industrial land uses would result.

Project implementation would not substantially interfere with or alter operations at nearby sensitive land uses. The nearest sensitive land uses include a church facility and two recreational areas. Access to these land uses would not be altered. Further, the overall

industrial character surrounding these land uses would remain substantially unchanged. No significant impact would result to nearby sensitive land uses.

The nearest dwelling units are located approximately 1,600 feet west of the project site. The project would not physically divide an established community. No land use impact would result to nearby dwelling units or any residential area.

The project would constitute industrial development on land that is zoned for heavy industrial use by the City. Both the General Plan and the Central Waterfront Area Plan indicate that power plants are compatible adjacent land uses to other heavy industrial activities along the Central Waterfront.

In the recent past, an increasing number of new residential units have been approved for development and/or constructed within the Central Waterfront area. As noted previously, applications for 398 housing units have been recently approved or are pending approval (see Figure 8.4-5 for those near the project site). Industrial operations at the project site resulting from implementation of the SFERP have the potential to conflict with new residential development in the nearby project vicinity. However, due to existing heavy industrial operations surrounding the project site and temporary industrial operations onsite, the existing land use characteristics of the project site and nearby area would not be substantially altered by SFERP operations. Thus, no significant land use impact to planned or approved residential development is anticipated to result from project implementation.

Future changes to San Francisco housing policy (such as those envisioned under the Central Waterfront Better Neighborhood Plan) could result in an increase in the intensity of residential development in the project vicinity. As noted earlier, the Central Waterfront Neighborhood Plan, if adopted, will encourage the addition of more than 1,500 housing units in the area. Implementing such changes may require formal modification of zoning and/or land use plans affecting the study area. These modifications would respond to the existing industrial characteristics at the project site and surrounding area, including (if implemented) those associated with the SFERP.

Development and operation of the SFERP facilities would not alter access to surrounding land uses, including open space areas that provide public access to the San Francisco Bay. Warm Water Cove and Islais Creek would continue to provide public access and recreational opportunities.

The project's linear features occur within predominantly commercial and industrial land uses. Because these facilities will be located sub-surface, operations will not affect surrounding land uses. The proposed pump station would not interfere with adjacent commercial and industrial operations.

8.4.6.3.2 Consistency with Existing Land Use Plans, Policies, and Regulations. The proposed project is consistent with applicable land use policies established in the General Plan and applicable Area Plans. Implementation of the SFERP is consistent with the General Plan policies related to growth in that it will result in a net benefit to the citizens of San Francisco by maintaining energy reliability with a relatively clean new energy source.

Applicable policies of the Central Waterfront Area Plan noted on Table 8.4-3 relate to: expanding and protecting existing industrial uses, mitigating adverse environmental impacts of

new development, and expanding industrial and maritime activity in the Islais Creek area. The SFERP would create electrical generation operations at the project site and preclude the conversion of industrial land to nonindustrial uses. Project implementation would support the expansion of industrial uses in the Islais Creek area and would not interfere with any planned expansion of maritime activity. Thus, the proposed SFERP is considered consistent with applicable goals and policies of the Central Waterfront Area Plan. The project will comply with applicable regulatory requirements to ensure that public health and safety is preserved (see Subsection 8.6, Public Heath and Subsection 8.7, Worker Health and Safety). Mitigation measures to avoid or minimize environmental effects of the SFERP are described throughout this document for each discipline.

Project elements within the boundaries of the South Bayshore Area Plan are limited to subsurface facilities, with the exception of the effluent pumping station. This facility is proposed within the Northern Industrial sub-district, and operation would not conflict with any of the South Bayshore Area Plan planning policies.

The zoning designation at the proposed project site is Heavy Industry (M-2). The Planning Code indicates a 40-foot height limitation on structures; however, unoccupied structures necessary for industrial facilities or public utilities are exempt from the height restrictions. Because the proposed 85-foot stack is a necessary component of the project, development of the SFERP facilities would conform to zoning and planning code requirements.

The project involves linear connections to the existing Potrero electrical substation, nearby gas transmission lines, and water lines. These linear facilities as well as the proposed pump station are located in areas zoned for heavy industry. Utility installations are a permitted use in the M-2 District under Section 227(e) of the Planning Code, provided that operating requirements necessitate location within the district (CCSF, 1999). Because these facilities are a requirement for operation of the SFERP, they are considered a permitted use.

Resolution 16202 of the San Francisco Planning Commission sets forth additional guidance for development proposals in areas within the Central Waterfront. It establishes "industrial protection zones" to protect diminishing industrial land uses along Third Street and north of 24th Street, and a "housing zone" in which mixed-use housing is encouraged. The SFERP project site is not located in either zone, but is adjacent and near areas within the industrial protection zone. The SFERP would not conflict with Resolution 16202 as applied to other development projects in the study area.

As described in Section 8.4.7, the final design of the SFERP project will be set forth in a site plan that is subject to review and comment by both the City of San Francisco and the CEC compliance project manager prior to commencement of construction activities. The 4-acre site will have lot coverage as described in Table 8.4-5.

TABLE 8.4-5
SFERP Lot Coverage by Type

Type	Square Feet
Buildings	23,950
Tanks	4,450
Structures	14,630
Total	**43,030**

In addition, the permits set forth in Section 8.4.8 will have to be obtained. These requirements will ensure that the project conforms to all requirements of the City Planning Code and/or other applicable planning regulations.

8.4.7 Cumulative Impacts

The CEQA Guidelines (Section 15355) define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." The CEQA Guidelines further note that "[t]he cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time."

As noted previously, recently completed "cumulative projects" within the study area include the construction of 63 new housing units within the area and a recent commercial structure at Cesar Chavez Street and Third Street. In addition, the City is currently constructing a light rail extension down Third Street; construction of that project will be complete before the proposed project will be licensed.

Present and foreseeable projects in the study area include the MUNI light rail facility adjacent to the project site, and pending or approved applications for the development of 398 housing units and several hundred thousand square feet of commercial development in the project vicinity. If the Central Waterfront Better Neighborhood Plan is adopted development of an additional 1,500 housing units would be encouraged in the Central Waterfront area. In addition, the Port of San Francisco is planning a large mixed-use development at Pier 70 and several industrial projects south of the project site.

The only other commercial electrical generation project proposed within the project study area is Potrero Unit 7. The proponent of Potrero Unit 7 (Mirant) is in bankruptcy proceedings and the application for certification before the California Energy Commission for Potrero Unit 7 is currently suspended. Further, it is formal City policy to oppose the construction of Potrero Unit 7. Accordingly, the City considers the construction of Potrero Unit 7 to be highly unlikely. Moreover, the City is pursing the SFERP in order to support shutdown of the Potrero power plant. Thus, overall electric generation within Southeast San Francisco should ultimately be reduced by the construction of the SFERP.

Land use impacts are typically limited to a project site and nearby vicinity. Cumulative land use impacts can result from multiple concurrent projects within close proximity. Construction of the SFERP may overlap with construction of the adjacent MUNI project. This would potentially result in cumulative impacts related to noise, dust, and traffic during construction activity. As noted previously, the SFERP would incorporate various measures to mitigate construction-related impacts. Further, such impacts would be temporary in nature. Therefore, potential cumulative impacts during construction are not considered significant.

The SFERP is consistent with applicable zoning and land use policies, and is considered compatible with adjacent and nearby land uses, including sensitive land uses. Impacts related to the potential intensification of residential development in the study area have been discussed previously. Given the minimal land use impact anticipated from the SFERP, the

local nature of land use impacts in general, and the amount and type of cumulative projects, significant cumulative land use impacts are not anticipated to result from SFERP operation.

8.4.8 Mitigation Measures

No significant land use impacts are anticipated from implementation of the SFERP. Therefore, no mitigation measures are proposed. However, project implementation will require demonstration of conformity to the laws, ordinances, regulations, and standards (LORS), and applicable permits noted below in Subsection 8.4.8. Project implementation will also be subject to City planning regulations, as follows:

> Prior to the commencement of construction activities, a site plan will be prepared and submitted to the City for review and comment, and to the CEC Compliance Project Manager for review and approval. The site plan will comply with all applicable provisions of the San Francisco Planning Code, including, but not limited to, Chapters 1.2, 1.5, 2.0, and 2.5.

8.4.9 Permits Required and Permit Schedule

Table 8.4-6 summarizes the required permits and anticipated schedule.

TABLE 8.4-6
Permits Required and Permit Schedule

Responsible Agency	Permit/Approval	Schedule
San Francisco Department of Public Works, Bureau of Street-Use and Mapping	Minor Encroachment Permit (for shoring during construction) and Street Improvement Permit (for repairs following excavation)	60–90 days
San Francisco Planning Department	Building Permit	60–90 days

8.4.10 Involved Agencies and Agency Contacts

Table 8.4-7 lists the agency contact names and phone numbers.

TABLE 8.4-7
Involved Agencies and Agency Contacts

Agency	Contact/Title	Telephone
San Francisco Department of Planning 1660 Mission Street San Francisco, CA 94103	Dean Macris Director	(415) 558-6411
San Francisco Department of Public Works Bureau of Street-Use and Mapping 30 Van Ness Avenue, 5th Floor San Francisco, CA 94102	John Kang Director of Permits	(415) 554-6209
Port of San Francisco Pier 1 Port of San Francisco San Francisco, CA 94111	Mark Lozovoy Director of Real Estate	(415) 274-0575

8.4.11 References

ABAG (Association of Bay Area Governments). 2005. Population Projections. http://www.abag.ca.gov/abag/overview/pub/p2000/summary.html. February 2005.

Association of Bay Area Governments. 1998. Bay Area Population Projections.

BCDC (Bay Conservation and Development Commission). 1975. San Francisco Waterfront Special Area Plan.

BCDC (Bay Conservation and Development Commission). 1998. San Francisco Bay Plan.

Beaupre, David. 2005. Port of San Francisco Planning. Telephone Conversation with Sarah Madams. February 14.

Chinn, Alton. 1999 and 2000. City and County of San Francisco Department of City Planning. Written and Telephone Communications with J. Smith (Radian).

CCSF (City and County of San Francisco) Department of City Planning. 1988. CCSF General Plan.

CCSF Department of City Planning. 1996. CCSF General Plan Updated.

CCSF Department of City Planning. 1997. CCSF General Plan Updated.

CCSF Department of City Planning. 1998. CCSF Zoning Maps.

CCSF Department of City Planning. 1999. CCSF Planning Code.

CCSF Department of City Planning. 2003. Draft Central Waterfront Neighborhood Plan. January 22.

CCSF Department of Public Works. 1999. CCSF Public Works Code.

CCSF Real Estate Division. 1999. Real Property Owned by the City and County of San Francisco as of Fiscal Year ending June 30, 1999.

Dames and Moore. 2000. Application for Certification. Potrero Power Plant Unit 7 Project. Section 8.4 Land Use. Prepared for Southern Company.

Lee, Jane. 2000. San Francisco Redevelopment Agency. Telephone Conversation with J. Smith (Radian).

Paez, Mark. 2004. Port of San Francisco Planning. Telephone Conversation with Steven Smith and subsequent fax transmittal. February 23.

PG&E (Pacific Gas & Electric). 1998. Application for Authorization to Sell Certain Generating Plants and Related Assets, Application 98-01-008, Environmental Impact Report.

Port of San Francisco. 1999. Waterfront Land Use Plan.

Potrero Central Waterfront Committee. 1999. San Francisco Central Waterfront Land Use Recommendations Report.

Richins, Paul. 1999. California Energy Commission. Telephone communication with J. Smith (Radian).

Rubin, Jasper. 1999. City and County of San Francisco Department of City Planning. Telephone Communication with J. Smith (Radian).

Rubin, Jasper. 2003. Plan Manager. Personal conversation with Steve Smith (CH2M HILL). December 19.

Rubin, Jasper. 2005. Plan Manager. Email communication with Sarah Madams (CH2M HILL). February 2.

San Francisco City Planning Commission. 1999. Regulation Number 14881 (Industrial Protection Zone and Mixed Use Housing Zones Within Industrially Zoned Land).

San Francisco Planning Department. 2001. San Francisco Southern Waterfront: Final Supplemental Environmental Impact Report.

San Francisco Redevelopment Agency. 1994. Hunters Point Redevelopment Plan.

Taeb, Azl. 1999. City and County of San Francisco Department of City Planning. Telephone Communication with J. Smith (Radian).

LEGEND

- PUMP STATION
- BAY CONSERVATION AND DEVELOPMENT COMMISSION
- CITY AND COUNTY OF SAN FRANCISCO
- PORT OF SAN FRANCISCO
- 1 - MILE BUFFER
- SITE LOCATION
- LAYDOWN CONSTRUCTION
- ELECTRIC TRANSMISSION LINE
- NATURAL GAS SUPPLY LINE
- POTABLE WATER LINE
- PROCESS WATER SUPPLY
- COLLECTION BOX

0 1,500 Feet

N

FIGURE 8.4-1
JURISDICTIONAL BOUNDARIES IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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LEGEND

- PUMP STATION
- ELECTRIC TRANSMISSION LINE
- NATURAL GAS SUPPLY LINE
- POTABLE WATER LINE
- PROCESS WATER SUPPLY
- COLLECTION BOX
- SITE LOCATION
- LAYDOWN CONSTRUCTION AREA
- 1 - MILE BUFFER
- COMMERCIAL
- INDUSTRIAL
- PUBLIC
- RESIDENTIAL

SOURCE: CITY OF SAN FRANCISCO GIS

0 1,500 Feet

N

FIGURE 8.4-2
EXISTING LAND USES IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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LEGEND

PUMP STATION

SITE LOCATION

LAYDOWN CONSTRUCTION AREA

1 - MILE BUFFER

HOUSE CHARACTER DISTRICTS

RH-1

RH-2

RH-3

MIXED HOUSE AND APARTMENT CHARACTER DISTRICTS

RM-1

RM-2

NEIGHBORHOOD COMMERCIAL DISTRICTS

NC-1

NC-2

NC-3

PUBLIC DISTRICT

P

INDUSTRIAL DISTRICTS

M-1

M-2

0 1,600 Feet

N

SOURCE: CITY OF SAN FRANCISCO GIS

FIGURE 8.4-3
ZONING DESIGNATIONS IN THE STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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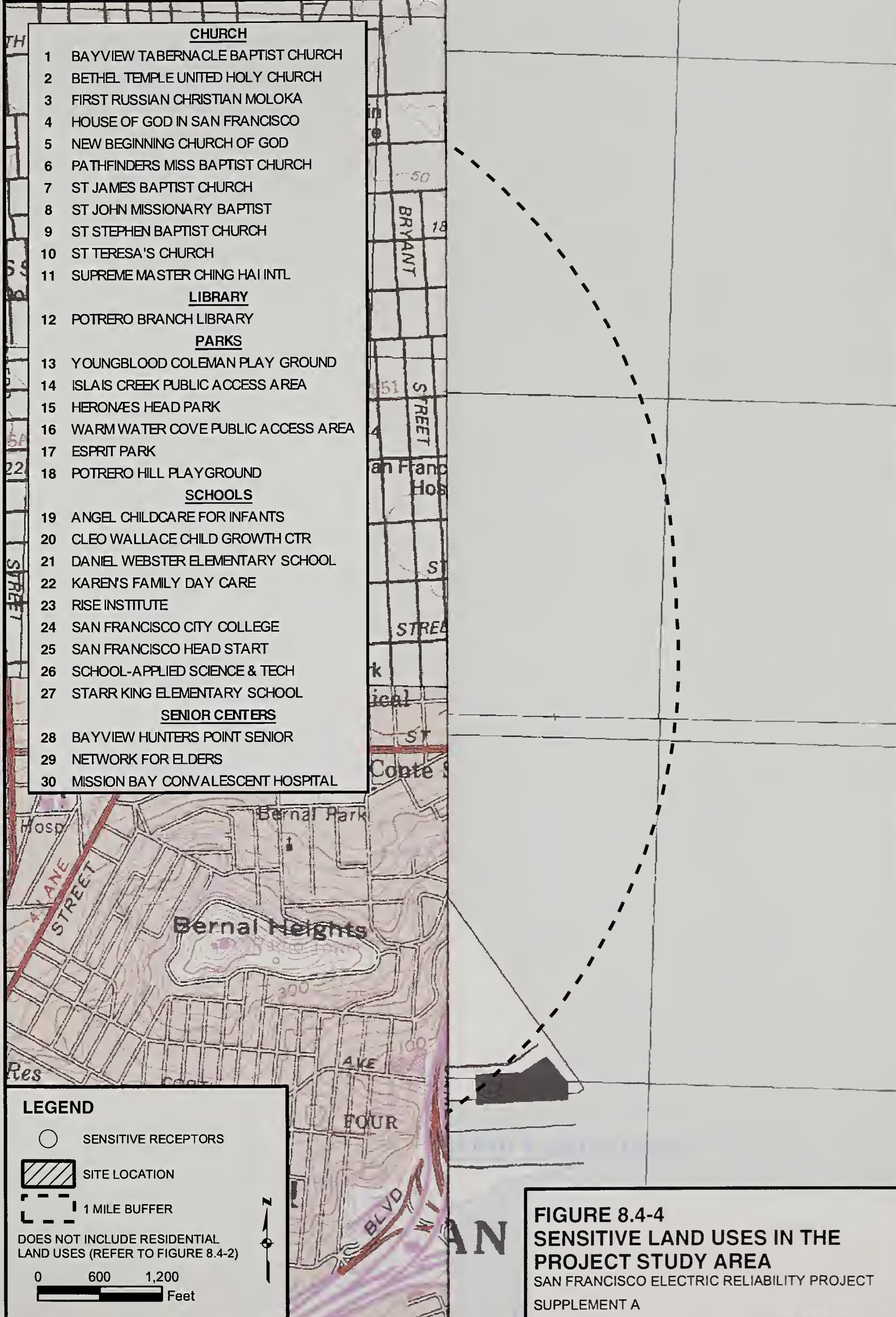

FIGURE 8.4-4
SENSITIVE LAND USES IN THE PROJECT STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

FIGURE 8.4-4
SENSITIVE LAND USES IN THE PROJECT STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

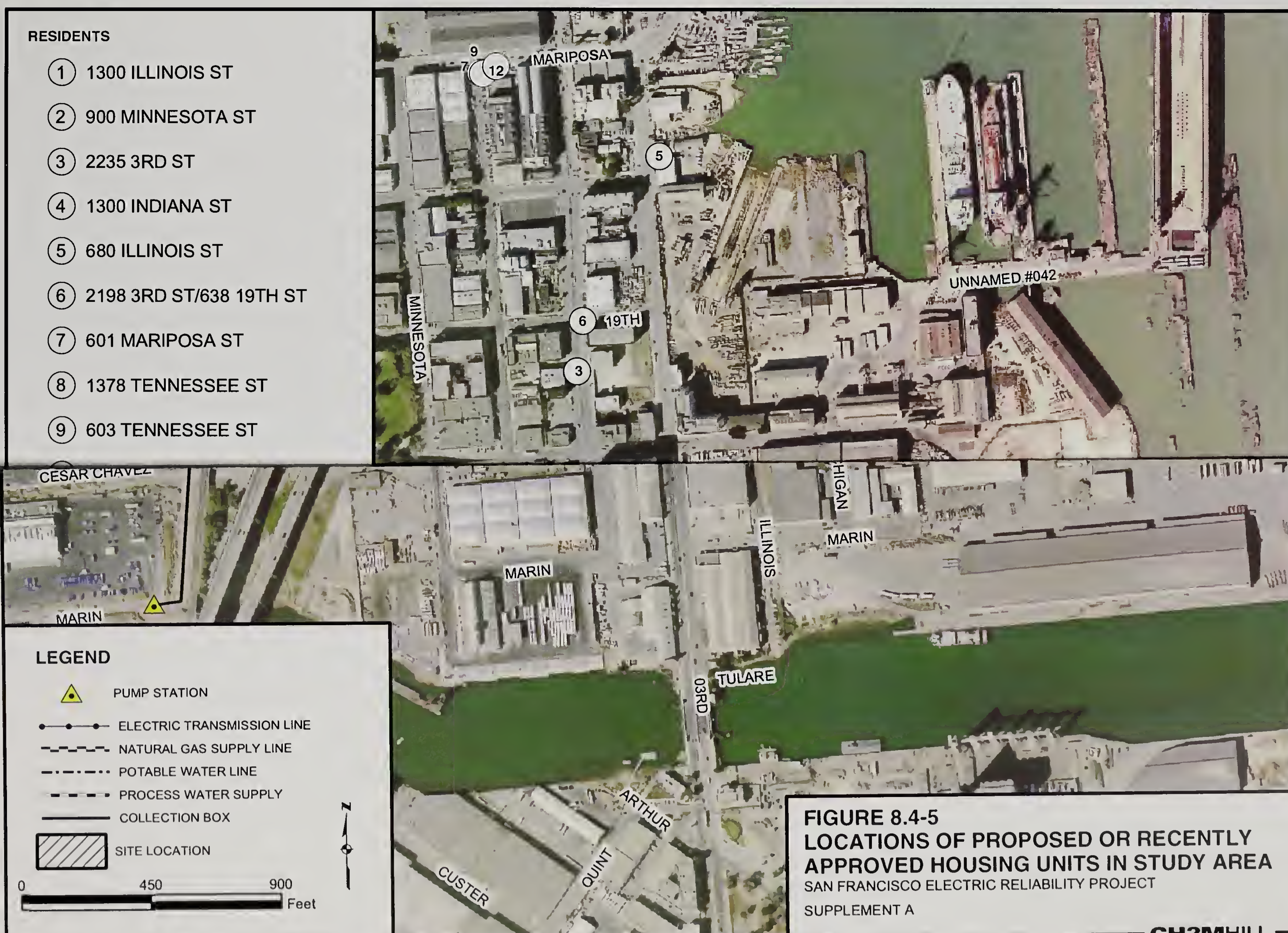

FIGURE 8.4-5
LOCATIONS OF PROPOSED OR RECENTLY APPROVED HOUSING UNITS IN STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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FIGURE 8.4-5
LOCATIONS OF PROPOSED OR RECENTLY APPROVED HOUSING UNITS IN STUDY AREA
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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SUBSECTION 8.5

Noise

8.5 Noise

8.5.1 Introduction

The project site is located in the City and County of San Francisco (CCSF). Generally, the design basis for noise control is the minimum, or most stringent, noise level required by any of the applicable laws, ordinances, regulations, or standards (LORS). Therefore, noise from this project is evaluated against San Francisco's General Plan and Noise Ordinance requirements.

Subsection 8.5.2 presents the fundamentals of acoustics while a description of the LORS is presented in Subsection 8.5.3. The affected environment is described in Subsection 8.5.4 and the environmental consequences (i.e., the potential project effects from both construction and operation) are analyzed in Subsection 8.5.5. Mitigation measures proposed to reduce potential impacts below the level of significance are presented in Subsection 8.5.6. The involved agencies and agency contacts are listed in Subsection 8.5.7. The permits and permitting schedule are discussed in Subsection 8.5.8. Subsection 8.5.9 provides the noise references.

Acoustic data was developed for the previously proposed San Francisco Electric Reliability Project (SFERP) at the corner of 23rd and Illinois Streets. Additional noise evaluations were made for that site to support the proceedings for the licensing of the larger Potrero Power Plant Unit 7 (PPPU7) Project (00-AFC-4). Because acoustic data from the 23rd and Illinois Streets site is considered representative of the proposed new location of the SFERP, this subsection refers to portions of the PPPU7 AFC filings (Dames & Moore, 2000) and the CEC's FSA (CEC, 2002) for the PPPU7 project.

8.5.2 Fundamentals of Acoustics

Acoustics is the study of sound, and noise is defined as unwanted sound. Airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure creating a sound wave. Acoustical terms used in this subsection are summarized in Table 8.5-1.

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise or sound at a given location. The ambient level is typically defined by the L_{eq} level.
Background Noise Level	The underlying ever-present lower level noise that remains in the absence of intrusive or intermittent sounds. Distant sources, such as traffic, typically make up the background. The background level is generally defined by the L_{90} percentile noise level.
Intrusive	Noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, time of occurrence, tonal content, the prevailing ambient noise level as well as the sensitivity of the receiver. The intrusive level is generally defined by the L_{10} percentile noise level.
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

TABLE 8.5-1
Definitions of Acoustical Terms

Term	Definition
A-Weighted Sound Level (dBA)	The sound level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighted filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Equivalent Noise Level (L_{eq})	The average A-weighted noise level, on an equal energy basis, during the measurement period.
Percentile Noise Level (L_n)	The noise level exceeded during n percent of the measurement period, where n is a number between 0 and 100 (e.g., L_{90})
Day-Night Noise Level (L_{dn} or DNL)	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels from 10:00 p.m. to 7:00 a.m.

The most common metric is the overall A-weighted sound level measurement that has been adopted by regulatory bodies worldwide. The A-weighting network measures sound in a similar fashion to how a person perceives or hears sound, thus achieving very good correlation in terms of how to evaluate acceptable and unacceptable sound levels.

A-weighted sound levels are typically measured or presented as equivalent sound pressure level (L_{eq}), which is defined as the average noise level, on an equal energy basis for a stated period of time, and is commonly used to measure steady state sound or noise that is usually dominant. Statistical methods are used to capture the dynamics of a changing acoustical environment. Statistical measurements are typically denoted by L_{xx}, where xx represents the percentile of time the sound level is exceeded. The L_{90} is a measurement that represents the noise level that is exceeded during 90 percent of the measurement period. Similarly, the L_{10} represents the noise level exceeded for 10 percent of the measurement period.

Another metric used in determining the impact of environmental noise is the differences in response that people have to daytime and nighttime noise levels. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes more noticeable. Furthermore, most people sleep at night and are sensitive to intrusive noises. To account for human sensitivity to nighttime noise levels, the Day-Night Sound Level (L_{dn} or DNL) was developed. L_{dn} is a noise index that accounts for the greater annoyance of noise during the nighttime hours.

L_{dn} values are calculated by averaging hourly L_{eq} sound levels for a 24-hour period, and apply a weighting factor to nighttime L_{eq} values. The weighting factor, which reflects the increased sensitivity to noise during nighttime hours, is added to each hourly L_{eq} sound level before the 24-hour L_{dn} is calculated. For the purposes of assessing noise, the 24-hour day is divided into two time periods, with the following weightings:

- Daytime: 7 a.m. to 10 p.m. (15 hours) Weighting factor of 0 dB.
- Nighttime: 10 p.m. to 7 a.m. (9 hours) Weighting factor of 10 dB.

The two time periods are then averaged to compute the overall L_{dn} value. For a continuous noise source, the L_{dn} value is easily computed by adding 6.4 dB to the overall 24-hour noise level (L_{eq}). For example, if the expected continuous noise level from the power plant was 60.0 dBA, the resulting L_{dn} from the plant would be 66.4 dBA.

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, learning.
- Physiological effects such as startling and hearing loss.

In most cases, environmental noise produces effects in the first two categories only. However, workers in industrial plants typically experience noise effects in the last category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a common standard is primarily due to the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is by comparing it to the existing or "ambient" environment to which that person has adapted. In general, the more the level or the tonal (frequency) variations of a noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

Table 8.5-2 shows the relative A-weighted noise levels of common sounds measured in the environment and in industry for various sound levels.

TABLE 8.5-2
Typical Sound Levels Measured in the Environment and Industry

Noise Source at a Given Distance	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Impression
Shotgun (at shooter's ear)	140	Carrier flight deck	Painfully loud
Civil defense siren (100 ft)	130		
Jet takeoff (200 ft)	120		Threshold of pain
Loud rock music	110	Rock music concert	
Pile driver (50 ft)	100		Very loud
Ambulance siren (100 ft)	90	Boiler room	
Pneumatic drill (50 ft)	80	Noisy restaurant	
Busy traffic; hair dryer	70		Moderately loud
Normal conversation (5 ft)	60	Data processing center	
Light traffic (100 ft); rainfall	50	Private business office	
Bird calls (distant)	40	Average living room library	Quiet
Soft whisper (5 ft); rustling leaves	30	Quiet bedroom	
	20	Recording studio	
Normal breathing	10		Threshold of hearing

Source: Beranek, 1998.

8.5.3 Laws, Ordinances, Regulations, and Standards

The following are the LORS that apply to noise generated by the project. They are summarized in Table 8.5-3.

TABLE 8.5-3
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Purpose	Applicability (Supplement A Section Explaining Conformance)
Federal Offsite		
USEPA	Guidelines for state and local governments.	Subsection 8.5.3.1.1.
Federal Onsite		
OSHA	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.5.3.1.2, 8.5.5.2.1 and 8.5.5.3.1. Also see Subsection 8.7, Worker Safety
State Onsite		
Cal/OSHA 8 CCR Article 105 Sections 095 et seq.	Exposure of workers over 8-hour shift limited to 90 dBA.	Subsections 8.5.3.2.1, 8.5.5.2.1 and 8.5.5.3.1. Also see Subsection 8.7, Worker Safety
State Offsite		
Calif. Vehicle Code Sections 23130 and 23130.5	Regulates vehicle noise limits on California highways.	Delivery trucks and other vehicles will meet Code requirements. Subsection 8.5.3.2.2.
Local		
California Government Code Section 65302	Requires local government to prepare plans that contain noise provisions.	City and County of San Francisco, Subsection 8.5.3.3.
San Francisco – Police Code Article 29, Sections 2901.11, 2909, 2915	Establishes a 75 dBA standard for industrial districts (M-2). Refer to Table 8.5-4 for detailed noise limits by zoning district. Provides a basis for public complaints if noises exceed the ambient by more than 5 dBA.	Subsections 8.5.3.3 and 8.5.5.3.4.
San Francisco – General Plan	The General Plan only addresses transportation-related noise.	Not Applicable.

8.5.3.1 Federal

8.5.3.1.1 USEPA. Guidelines are available from the USEPA (1974) to assist state and local government entities in development of state and local LORS for noise. Because there are local LORS that apply to this project, these guidelines are not applicable.

8.5.3.1.2 OSHA. Onsite noise levels are regulated, in a sense, through the Occupational Safety and Health Act of 1970 (OSHA). The noise exposure level of workers is regulated at 90 dBA, over an 8-hour work shift to protect hearing (29 Code of Federal Regulations [CFR] 1910.95).

Onsite noise levels will generally be in the 70- to 85-dBA range. Areas above 85 dBA will be posted as high noise level areas and hearing protection will be required. The power plant will implement a hearing conservation program for applicable employees and maintain exposure levels below 90 dBA.

8.5.3.2 State of California

8.5.3.2.1 Cal-OSHA. The California Department of Industrial Relations, Division of Occupational Safety and Health enforces California Occupational Safety and Health Administration (Cal-OSHA) regulations, which are the same as the federal OSHA regulations described previously. The regulations are contained in Title 8 of the California Code of Regulations (CCR), General Industrial Safety Orders, Article 105, Control of Noise Exposure, Sections 5095, et seq.

8.5.3.2.2 California Vehicle Code. Noise limits for highway vehicles are regulated under the California Vehicle Code, Sections 23130 and 23130.5. The limits are enforceable on the highways by the California Highway Patrol and the County Sheriff Offices.

8.5.3.3 Local

The California State Planning Law (California Government Code Section 65302) requires that all cities, counties, and entities (such as multi-city port authorities) prepare and adopt a General Plan to guide community change. The San Francisco General Plan contains noise provisions for transportation-related sources. The City Police Code, Article 29, contains provisions for stationary sources and establishes a 75 dBA standard for industrial districts (M-2). Table 8.5-4 identifies noise limits by zoning district. In addition, Article 29 provides a basis for public complaints of noises exceeding the ambient by more than 5 dBA.

TABLE 8.5-4
San Francisco Noise Level Limits by Zoning District

Zoning District	Time Period	Sound Level (dBA)
R-1-D, R-1, R-2 – Residential one and two houses	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	50 55
R-3, R-3.5, R-4, R-5, R-3-C, R-3.5-C, R-4-C, R-5-C – Residential multiple households and commercial/residential	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	55 60
C-1, C-2, C-3-O, C-3-R Commercial and Commercial/residential	10 p.m. to 7 a.m. 7 a.m. to 10 p.m.	60 70
M-1 – Light Industrial	Anytime	70
M-2 – Heavy Industrial	Anytime	75

Source: Dames & Moore, 2000.

8.5.4 Affected Environment

The proposed San Francisco Electric Reliability Project (SFERP) site is an approximately 4-acre parcel in the Potrero District between Cesar Chavez and 25th streets. The project site

(Figure 8.5-1) is located along the eastern side of the San Francisco Peninsula, near the San Francisco Bay and south of Warm Water Cove. Existing uses on, and adjacent to, the site are primarily industrial and commercial. The site currently contains a cement batch plant, which will be relocated. On the west side of the project (between the project site and Illinois Street) the San Francisco Municipal Railway (MUNI) is planning to build an Operations and Maintenance facility for its vehicles. The area directly to the east is currently used as temporary storage for semi trailers for the Moscone Convention Center. To the south is the Port of San Francisco's Pier 80 cargo terminal. The main street entrance to the cargo terminal is Cesar Chavez Street.

A residentially zoned neighborhood (zoned RH-3) exists along Tennessee Street, north of Tubbs Street, approximately 2,000 feet from the site (referred to as Receptor 3 or R3 as shown on Figure 8.5-1). Noise from the existing Potrero Power Plant is not audible at any of these residences as a result of distance and the noise attenuating effects of the intervening industrial buildings (Dames & Moore, 2000). Therefore, noise from SFERP would not be audible since the plant is even farther from these residences. Other residences are located farther away in the Potrero Hill neighborhood west of Interstate 280 (CEC, 2002). See also Figure 8.4-3.

Additional dwelling units are located on the southwest corner of the intersection of 23rd Street and Minnesota Street (about 2,000 feet from the proposed facility). This building was under construction when the PPPU7 AFC was filed and was the location of the 25-hour noise monitoring (Monitoring Location 1, shown as ML1 on Figure 8.5-1) conducted for PPPU7 (Dames & Moore, 2000). Additional dwelling units are located south of ML1, at Minnesota Street and 24th Street (R2 on Figure 8.5-1), Minnesota Street and 25th Street (R1 on Figure 8.5-1) and Cesar Chavez and Indiana streets (R4 on Figure 8.5-1). All of these are approximately 2,000 feet from the proposed facility.

The closest dwelling units (R1) are located at the corner of Minnesota and 25th streets. Although these units are only 1,600 feet from the project site, they were not considered the nearest residential receptors because there are located in an area that is zoned M-2, Heavy Industrial, and residents living in an industrially zoned area would not have the same expectation of low ambient noise levels as those living in a residentially zoned area (Edwards, 2005).

Sources of environmental noise in the project area are primarily transportation-related.

8.5.4.1 Ambient Noise Survey

As part of the PPPU7 proceeding, measurements were collected on August 18 and 19, 1999 and on October 11 and 12, 1999 at four locations depicted in Figure 8.5-1. Since this monitoring was conducted, there have been no significant industrial changes in the area. Measurement results are summarized in Tables 8.5-5 through 8.5-7 (Dames & Moore, 2000).

TABLE 8.5-5
Short Term Sound Level Measurements, Measured on August 18 and 19, 1999

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
ML2: Approximately 100 Feet South of 23rd Street						
3:00 a.m. – 4:00 a.m.	61.7	62.3	61.5	58.7	54.5	71.9
2:00 p.m. – 3:00 p.m.	65.1	68.0	64.0	57.1	55.7	77.6
7:00 p.m. – 8:00 p.m.	64.5	66.9	63.0	57.2	52.6	74.4
ML3: Illinois Street Property Line at PG&E's Existing Potrero Substation						
4:00 a.m. – 5:00 a.m.	54.2	56.4	52.0	51.4	50.9	74.1
3:00 p.m. – 4:00 p.m.	61.8	64.2	59.9	58.7	57.4	73.4
8:00 p.m. – 9:00 p.m.	60.5	62.5	55.8	55.5	53.1	78.1
ML4: Approximately 50 Feet from the Intersection of 22nd and Missouri						
1:30 a.m. – 2:30 a.m.	49.8	52.5	48.9	45.4	43.2	60.8
1:00 p.m. – 2:00 p.m.	58.6	60.7	56.0	53.5	51.5	75.4
9:00 p.m. – 10:00 p.m.	50.6	52.0	49.4	46.6	42.9	69.9

Notes:
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.
All sound levels are expressed in dBA.
Source: Dames & Moore, 2002.

TABLE 8.5-6
25-Hour Sound Level Measurements, Offsite Measurement Location 1 (ML1) Sound Levels Measured on October 11 and 12, 1999, at ML1 Approximately 50 Feet from the Intersection of 23rd Street and Minnesota Avenue

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}	Note
9:00 a.m. – 10:00 a.m.	68.6	71.9	63.5	58.9	55.4	90.7	1, 2, 3
10:00 a.m. – 11:00 a.m.	68.6	72.5	63.5	59.1	55.9	86.8	1, 2, 3
11:00 a.m. – 12:00 p.m.	68.0	71.6	63.5	57.1	46.1	90.3	1, 2, 3
12:00 p.m. – 1:00 p.m.	67.1	68.8	63.0	59.9	55.5	87.4	1, 2, 3
1:00 p.m. – 2:00 p.m.	66.2	68.9	62.0	57.2	46.9	84.9	1, 2, 3
2:00 p.m. – 3:00 p.m.	68.2	69.3	64.0	60.4	56.4	90.3	1, 2, 3
3:00 p.m. – 4:00 p.m.	66.1	68.7	62.4	60.1	55.4	83.2	1, 2, 3
4:00 p.m. – 5:00 p.m.	65.0	67.6	63.0	60.8	57.6	77.4	1, 2, 3
5:00 p.m. – 6:00 p.m.	65.6	68.1	62.4	60.0	56.8	83.5	1, 2, 3, 4
6:00 p.m. – 7:00 p.m.	66.2	67.8	61.5	59.3	56.2	87.8	1, 3
7:00 p.m. – 8:00 p.m.	63.8	66.3	60.0	56.4	52.6	83.0	1, 3
8:00 p.m. – 9:00 p.m.	60.9	61.8	56.6	54.3	49.7	83.0	1, 3
9:00 p.m. – 10:00 p.m.	61.7	63.5	57.9	53.8	51.5	83.0	1, 3
10:00 p.m. – 11:00 p.m.	59.2	60.1	54.6	51.6	49.5	79.1	1, 3
11:00 p.m. – 12:00 a.m.	57.3	57.3	52.6	49.9	47.8	80.5	1, 3
12:00 a.m. – 1:00 a.m.	56.3	58.0	52.0	49.5	48.5	72.3	1
1:00 a.m. – 2:00 a.m.	56.1	57.1	51.8	49.9	48.9	75.6	1

TABLE 8.5-6
25-Hour Sound Level Measurements, Offsite Measurement Location 1 (ML1) Sound Levels Measured on October 11 and 12, 1999, at ML1 Approximately 50 Feet from the Intersection of 23rd Street and Minnesota Avenue

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}	Note
2:00 a.m. – 3:00 a.m.	55.9	57.2	51.5	49.8	48.9	78.9	1
3:00 a.m. – 4:00 a.m.	58.8	59.1	50.3	47.4	44.7	80.1	1
4:00 a.m. – 5:00 a.m.	60.0	62.6	54.0	50.3	46.7	78.8	1
5:00 a.m. – 6:00 a.m.	61.5	62.4	55.5	53.4	51.0	82.7	1
6:00 a.m. – 7:00 a.m.	65.8	69.1	59.9	55.9	52.5	84.7	1, 3
7:00 a.m. – 8:00 a.m.	68.3	70.5	61.6	57.6	54.7	89.2	1, 2, 3
8:00 a.m. – 9:00 a.m.	66.8	69.9	61.8	58.0	55.6	83.5	1, 2, 3
9:00 a.m. – 10:00 a.m.	65.3	68.1	61.3	57.1	54.6	80.7	1, 2, 3

Notes:
All sound levels are expressed in dBA.
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.

1. General vehicular traffic.
2. Construction activity (construction vehicles, power tools, banging and clanging of materials) at new live/work/loft.
3. Industrial activity at adjacent businesses.
4. Helicopter overflights.

Source: Dames & Moore, 2002.

TABLE 8.5-7
Short Term Sound Level Measurements, Measured on October 11 and 12, 1999

Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{min}	L_{max}
ML2: Approximately 100 Feet South of 23rd Street						
10:00 a.m. – 11:00 a.m.	63.5	64.4	58.5	55.6	52.6	79.7
7:00 p.m. – 8:00 p.m.	62.9	66.5	58.1	54.0	51.0	77.7
11:00 p.m. – 12:00 a.m.	60.2	64.0	55.5	52.9	49.9	79.9
ML4: Approximately 50 Feet from the Intersection of 22nd and Missouri						
11:15 a.m. – 12:15 p.m.	55.3	56.5	54.0	53.0	52.4	67.5
8:15 p.m. – 9:15 p.m.	52.1	55.9	51.5	48.8	46.9	65.8
10:00 p.m. – 11:00 p.m.	49.8	52.1	48.9	46.9	46.0	67.1

Notes:
All sound levels are expressed in dBA.
The temperature during the measurement periods ranged from approximately 55 degrees to 75 degrees.
The wind speed was less than 5 mph. The sky ranged from clear to overcast. There was no precipitation during the measurement periods. The humidity was not recorded.
ML2: Primary noise sources were vehicular traffic on nearby roads and industrial facilities. Noise from the Potrero Power Plant was audible during the measurement periods.
ML4: Primary noise sources were from vehicular traffic on Missouri Avenue and I-280. Noise from light industrial sources was periodically audible during the daytime. Noise from the Potrero Power Plant was not audible during the measurement periods.
Source: Dames & Moore, 2002.

During the ambient noise monitoring for PPPU7, the primary source of noise during the quietest portion of the night was identified as vehicular traffic at ML1. The average noise levels over the 25-hour period were 65.9 dBA L_{eq}, 68.2 dBA L_{dn} and 55.9 dBA L_{90}. The average L_{90} of the 4 quietest continuous hours at ML1 is 49 dBA. The average noise levels at the 3 short-term noise measurements sites were in the range of 60 to 65 dBA L_{eq} at ML2, 54 to 62 dBA L_{eq} at ML3, and 50 to 59 dBA L_{eq} at ML4. The existing Potrero Power Plant was noted to be 47 dBA and audible at ML2, which is located near the Mirant property boundary (CEC, 2002).

The measurements collected at ML1 for PPPU7 are expected to be very similar to those experienced at the closest existing dwelling units for the proposed new SFERP location, designated as Receptor 1 (R1), which is located on the corner of 25th and Minnesota streets. Supplemental measurements, which were collected on February 22 & 23, 2005 at ML5 (located at the Army Street Mini Storage on Cesar Chavez and Indiana streets), result in somewhat louder levels than reported for ML1. This is not unexpected as ML5 is closer to Interstate 280 than ML1 and Cesar Chavez is a larger thoroughfare than 23rd Street. Similarly, previous measurements at ML4, taken for PPPU7, would be representative of areas west of Interstate 280, where local and interstate vehicular traffic dominates the noise environment. Therefore, the data collected previously for PPPU7 were considered representative for use in this supplement and represent a conservative basis for this analysis, as it is quieter.

TABLE 8.5-8
Summary of Noise Measurements at ML5 (in dBA)

Date	Start Time	L_{eq}	L_{10}	L_{50}	L_{90}
22-Feb-05	16:00:00	69	70	69	67
22-Feb-05	17:00:00	67	69	66	64
22-Feb-05	18:00:00	69	70	69	67
22-Feb-05	19:00:00	67	69	67	65
22-Feb-05	20:00:00	66	67	65	63
22-Feb-05	21:00:00	65	67	65	62
22-Feb-05	22:00:00	64	66	64	61
22-Feb-05	23:00:00	62	64	62	58
23-Feb-05	0:00:00	61	64	60	56
23-Feb-05	1:00:00	60	63	59	54
23-Feb-05	2:00:00	59	62	57	52
23-Feb-05	3:00:00	59	62	57	52
23-Feb-05	4:00:00	60	63	59	54
23-Feb-05	5:00:00	64	66	63	60
23-Feb-05	6:00:00	67	69	67	64
23-Feb-05	7:00:00	69	71	69	67
23-Feb-05	8:00:00	69	71	69	68

8.5.5 Environmental Consequences

The proposed SFERP will produce noticeable noise but the noise levels will be in compliance with San Francisco's Noise Ordinance requirements for industrial properties. Noise will also be produced at the site during the construction phase of the project. Potential noise impacts from construction and operation activities are assessed in this subsection.

8.5.5.1 Significance Criteria

The City has established quantitative standards for determining appropriate noise levels for various zoning districts. These standards are summarized in Table 8.5-4. Noise impacts may be considered significant if project operational activities conflict with the Noise Level Limits by Zoning District summarized in Table 8.5-4.

In addition to the City criteria, the Energy Commission Staff concluded that a potential for a significant noise impact exists where the noise of the project exceeds the background noise by 5 dBA or more (CEC, 2002). It is important to note that the potential for an impact does not mean that there is an impact. Rather, it means that the project noise levels need further evaluation. The Energy Commission Staff concluded that construction noise is typically insignificant if (1) the construction activity is temporary, (2) use of heavy equipment and noisy activities is limited to daytime hours, and (3) all feasible noise abatement measures are implemented for noise-producing equipment (CEC, 2002).

8.5.5.2 Construction Impacts

This subsection addresses the various components of construction noise and vibration.

8.5.5.2.1 Worker Exposure to Noise. Worker exposure levels during construction of the SFERP will vary depending on the phase of the project and the proximity of the workers to the noise-generating activities. Hearing protection will be available for workers and visitors to use as needed throughout the duration of the construction period. A Hearing Protection Plan, which complies with Cal-OSHA requirements, will be incorporated into the Health and Safety Plan.

8.5.5.2.2 Plant Construction Noise. Construction of the SFERP is expected to be typical of other power plants in terms of schedule, equipment used, and other types of activities. The noise level will vary during the construction period, depending upon the construction phase. Construction of power plants can generally be divided into five phases that use different types of construction equipment. The five phases are (1) demolition, site preparation, and excavation; (2) concrete pouring; (3) steel erection; (4) mechanical; and (5) clean-up (Miller et al., 1978). In contrast to PPPU7, steam blows will not be required for the SFERP.

Both the USEPA Office of Noise Abatement and Control and the Empire State Electric Energy Research Company have extensively studied noise from individual pieces of construction equipment as well as from construction sites of power plants and other types of facilities (USEPA, 1971; Barnes et al., 1976). Since specific information on types, quantities, and operating schedules of construction equipment is not available at this point in project development, information from these documents for similarly sized industrial projects will be used. Use of this data, which is between 21 and 26 years old, is conservative since the evolution of construction equipment has been toward quieter designs to protect operators from exposure to high noise levels.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 8.5-9. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each phase.

TABLE 8.5-9
Construction Equipment and Composite Site Noise Levels

Construction Phase	Loudest Construction Equipment	Equipment Noise Level (dBA) at 50 feet	Composite Site Noise Level (dBA) at 50 feet
Demolition, Site Clearing, and Excavation	Dump Truck Backhoe	91 85	89
Concrete Pouring	Truck Concrete Mixer	91 85	78
Steel Erection	Derrick Crane Jack Hammer	88 88	87
Mechanical	Derrick Crane Pneumatic Tools	88 86	87
Cleanup	Rock Drill Truck	98 91	89

Source: USEPA, 1971; Barnes et al., 1976.

Average or equivalent construction noise levels projected at various distances from the site are presented in Table 8.5-10. These results are conservative since the only attenuating mechanism considered was divergence of the sound waves in open air. Shielding effects of intervening structures are not included in the calculations. The construction noise may be audible at the nearest dwelling units but is not anticipated to exceed current exposure levels and the noisiest construction activities will be confined to the daytime hours. Table 8.5-11 presents noise levels from common construction equipment at various distances.

TABLE 8.5-10
Average Construction Noise Levels at Various Distances

Construction Phase	Sound Pressure Level (dBA)		
	375 feet	1,500 feet	3,000 feet
Demolition, Site Clearing, and Excavation	71	59	53
Concrete Pouring	60	48	42
Steel Erection	69	57	51
Mechanical	69	57	51
Clean-Up	71	59	53

TABLE 8.5-11
Noise Levels from Common Construction Equipment at Various Distances

Construction Equipment	Typical Sound Pressure Level at 50 feet (dBA)	Typical Sound Pressure Level at 375 feet (dBA)	Typical Sound Pressure Level at 1,500 feet (dBA)
Pile Drivers (20,000-32,000 ft-lbs./blow)	104	86	74
Dozer (250-700 hp)	88	70	58
Front End Loader (6-15 cu. yds.)	88	70	58
Trucks (200-400 hp)	86	68	56
Grader (13 to 16 ft. blade)	85	67	55
Shovels (2-5 cu. yds.)	84	66	54
Portable Generators (50-200 kW)	84	66	54
Derrick Crane (11-20 tons)	83	65	53
Mobile Crane (11-20 tons)	83	65	53
Concrete Pumps (30-150 cu. yds.)	81	63	51
Tractor (3/4 to 2 cu. yds.)	80	62	50
Unquieted Paving Breaker	80	62	50
Quieted Paving Breaker	73	55	43

Noise generated during the testing and commissioning phase of the project is not expected to be substantially different from that produced during normal full-load operation. Starts and abrupt stops are more frequent during this period, but on the whole they are usually short-lived.

8.5.5.2.3 Construction Vibration. Construction vibrations can be divided into three classes, based on the wave form and its source (see Table 8.5-12). Pile driving is anticipated. It will be limited to normal construction hours (during the daytime) and will be of short duration; therefore, no mitigation is required.

TABLE 8.5-12
Construction Vibrations

Wave Form	Example Source
Impact	Impact pile driver or blasting
Steady state	Vibratory pile driver
Pseudo steady state	Double acting pile hammer

8.5.5.3 Operational Impacts

This subsection describes the expected noise impacts from operation of the plant.

8.5.5.3.1 Worker Exposure to Operational Noise. Nearly all components will be specified not to exceed near-field maximum noise levels of 90 dBA at 3 feet (or 85 dBA at 3 feet where available as a vendor standard). Since there are no permanent or semi-permanent workstations located near any piece of noisy plant equipment, no worker's time-weighted average exposure to noise should approach the level allowable under OSHA guidelines. Nevertheless, signs requiring the use of hearing protection devices will be posted in all areas where noise levels commonly exceed 85 dBA, such as inside acoustical enclosures. Outdoor levels throughout the plant will typically range from 90 dBA near certain equipment to roughly 65 dBA in areas more distant from any major noise source.

8.5.5.3.2 Transmission Line and Switchyard Noise Levels. SFERP will connect to the power grid through the PG&E Potrero Substation by two redundant 3-phase 115-kV solid dielectric underground transmission circuits. Two options are being considered for connection to the Potrero Substation. One is to have the circuits enter the substation underground from Illinois Street; the other is to have the circuits enter the substation from 22nd Street to an underground/overhead transition structure located on the eastern portion of the switchyard. One of the electrical effects of high-voltage transmission lines is corona. Corona is the ionization of the air that occurs at the surface of the energized conductor and suspension hardware due to very high electric field strength at the surface of the metal during certain conditions. Corona may result in radio and television reception interference, audible noise, light, and production of ozone. Corona is generally a principle concern with transmission lines of 345 kV and higher. The project's use of shielded solid dielectric cable encased in an underground concrete duct bank will eliminate the corona effects. Consequently, no noise impact is expected from the operation of the electrical transmission lines.

8.5.5.3.3 Process Water Supply Pipeline and Water Pump Station Noise Levels. Operational noise from the buried process water supply pipeline is not anticipated to generate any audible noise. The water pump station will be designed to comply with the City's noise requirements and is not anticipated to increase offsite noise level by a measurable amount.

8.5.5.3.4 Plant Operation Noise Levels. A noise model of the proposed SFERP facility has been developed using source input levels derived from manufacturers' data and field surveys of similar equipment. The noise emissions from the plant have been calculated at the residential receptors of potential concern. The noise levels presented represent the anticipated steady-state level from the plant with essentially all equipment operating.

The model divides the proposed facility into a list of individual point and area noise sources representing each piece of equipment that produces a significant amount of noise. The sound power levels representing the standard performance of each of these components are assigned based either on field measurements of similar equipment made at other existing plants, data supplied by manufacturers, or information found in the technical literature. Using these standard power levels as a basis, the model calculates the sound pressure level that would occur at each receptor from each source after losses from distance, air absorption, blockages, etc. are considered. The sum of all these individual levels is the total

plant level at the modeling point. The sound propagation factors used in the model have been adopted from ISO 9613-2 *Acoustics – Sound Attenuation During Propagation Outdoors.*

The sound power levels, by octave band, used in the model are summarized in Table 8.5-13. Noise from the project is predicted not to exceed 54 dBA at either ML1 (the closest residentially zoned receptor) or R1 (the closest dwelling unit)(see Figure 8.5-1). This is consistent with the CEC's 5 dBA over background guideline and complies with LORS.

TABLE 8.5-13
Octave Band Sound Power Levels Used to Model SFERP Operations, dB (Flat)

	Octave Band Center Frequency, Hz								
Plant Component	**31.5**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**dBA**
Stacks[a]	122	115	106	102	94	80	80	83	78	97.7
LM6000 Combustion Turbine Generators (CTG)	116	115.1	110.8	109.4	104.6	101.1	99.4	100.3	90.5	108.3
Cooling Tower	108	108	109	106	101	93	89	87	85	102.4
Chiller	96.2	85.7	91.5	82.6	90.6	89.2	70.1	59	41.4	91.6
Fuel Gas Compressors[b]	116.9	116.6	111.1	111.2	109.4	107.8	109.9	109.1	107.5	116
Gas Cooler[b]	106.8	111.3	107.4	97.7	98.7	93.4	99.4	102.8	101.0	107.3
Transformers	108	111	105	105	100	94	91	88	88	102
SCR Duct Walls	121.4	117	113	106.2	97.1	83.2	75.6	73	62	101.7

Notes:

[a] Includes stack silencers.

[b] If shielding provided by the proposed MUNI Maintenance facility is not sufficient or if this project is operational prior to the construction of the MUNI Maintenance building, a combination of noise barriers or enclosures will be constructed to reduce these levels by at least 13 dBA.

8.5.5.3.5 Tonal Noise. As a general rule, LM6000-based plants, even those without significant noise controls, do not produce discrete tones that are prominent or noticeable at typical receptor distances. At the monitoring locations modeled here, no significant tones are anticipated.

That is not to say that audible tones are impossible—certain sources within the plant such as the combustion turbine inlets, transformers, pump motors, cooling tower fan gearboxes, etc. have been known to sometimes produce significant tones. It is the Applicant's intention to anticipate the potential for audible tones in the design and specification of the plant's equipment and take necessary steps to prevent sources from emitting tones that might be disturbing at the nearest receptors.

8.5.5.3.6 Ground and Airborne Vibration. Similar LM6000-based facilities have not resulted in ground or airborne vibration impacts. The proposed project is primarily driven by gas turbines exhausting into a selective catalytic reduction (SCR) duct and a stack silencer. These very large ducts reduce low frequency noise, which is mainly the source of airborne induced vibration of structures.

The equipment that would be used in the proposed project is well balanced and is designed to produce very low vibration levels throughout the life of the project. An imbalance could contribute to ground vibration levels in the vicinity of the equipment. However, vibration-monitoring systems installed in the equipment are designed to ensure that the

equipment remains balanced. Should an imbalance occur, the event would be detected and the equipment would automatically shut down.

8.5.6 Mitigation Measures

The following mitigation measures are anticipated to be included in the project.

8.5.6.1 Noise Mitigation Measure #1

The City shall establish a telephone number for use by the public to report any significant undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

8.5.6.2 Noise Mitigation Measure #2

Throughout the construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all legitimate project related noise complaints.

The City or authorized agent shall:

- Use the Noise Complaint Resolution Form typically suggested by CEC or functionally equivalent procedure to document and respond to each noise complaint.
- Attempt to contact the person(s) making the noise complaint within 24 hours.
- Conduct an investigation to attempt to determine the source of noise related to the complaint.
- If the noise complaint is legitimate, take all feasible measures to reduce the noise at its source.

8.5.6.3 Noise Mitigation Measure #3

Noisy construction or demolition work (that which causes offsite annoyance as evidenced by the filing of a legitimate noise complaint) shall be restricted to 7 a.m. to 8 p.m. unless otherwise permitted in accordance with the San Francisco Municipal Code Section 2908.

Construction equipment shall comply with the noise level limits of the San Francisco Municipal Code, Section 2907. Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

8.5.6.4 Noise Mitigation Measure #4

The project design and implementation shall include noise mitigation measures adequate to ensure that operation of the project will not exceed the noise standards of the City Municipal Code. Specifically, noise caused by operation of the project shall not exceed the existing background noise level (49 dBA – calculated by averaging the 4 quietest continuous

hours recorded at ML1) by more than 5 dBA. The resulting noise levels will, therefore, not exceed 54 dBA at ML1 or R1.

Furthermore, the project will not result in noise impacts at residentially or commercially zoned areas in excess of the City's noise zoning criteria. Live/work units located in areas zoned light or heavy industrial (M1 or M2) are considered industrial uses (Edwards, 2005).

8.5.7 Involved Agencies and Agency Contacts

Agency contacts relative to noise issues are presented in Table 8.5-14.

TABLE 8.5-14
Agency Contacts

Agency	Contact	Issue	Telephone
San Francisco Police Department	Officer Qwan 201 Williams Street San Francisco, CA	Article 29 of Police Code	(415) 671-2300
San Francisco Department of Public Health	Tom Rivard, Senior Environmental Health Inspector	Noise Standards	(415) 252-3840
San Francisco Planning Department	Jasper Rubin, Planner/Geographer 1600 Mission Street San Francisco, CA 94103-2414	Noise Standards	(415) 558-6310

8.5.8 Permits Required and Permit Schedule

No permits are required; therefore, there is no permit schedule.

8.5.9 References

Barnes et al. 1976.

Beranek, L.L. 1998. *Noise and Vibration Control.* Institute of Noise Control Engineering. McGraw Hill.

California Energy Commission. 2002. Final Staff Assessment. Potrero Power Plant Unit 7 Project. Noise. Testimony of Jim Buntin.

Dames & Moore. 2000. Application for Certification. Potrero Power Plant Unit 7 Project. Section 8.5 Noise. Prepared for Southern Company. 2000.

Dames & Moore. 2002.

Edwards, Dale. 2005. Personal conversation between Dale Edwards (CEC) and John Carrier. February 16.

International Organization for Standardization. 1996. Acoustics—Attenuation of sound during propagation outdoors, Part 2: General method of calculation ISO 9613-2, Geneva, Switzerland.

Miller, Laymon N., et al. 1984. *Electric Power Plant Environmental Noise Guide*, 2nd Edition. Edison Electric Institute, New York.

Miller, L.N., E.W. Wood, R.M. Hoover, A.R. Thompson, and S.L. Thompson, and S.L. Paterson. 1978. *Electric Power Plant Environmental Noise Guide*, Vol. 1. Bolt Beranek & Newman, Inc. Cambridge, MA. Prepared for the Edison Electric Institute, New York.

U.S. Environmental Protection Agency (USEPA). 1971. Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances. Prepared by Bolt Beranek and Newman for USEPA Office of Noise Abatement and Control, Washington, DC.

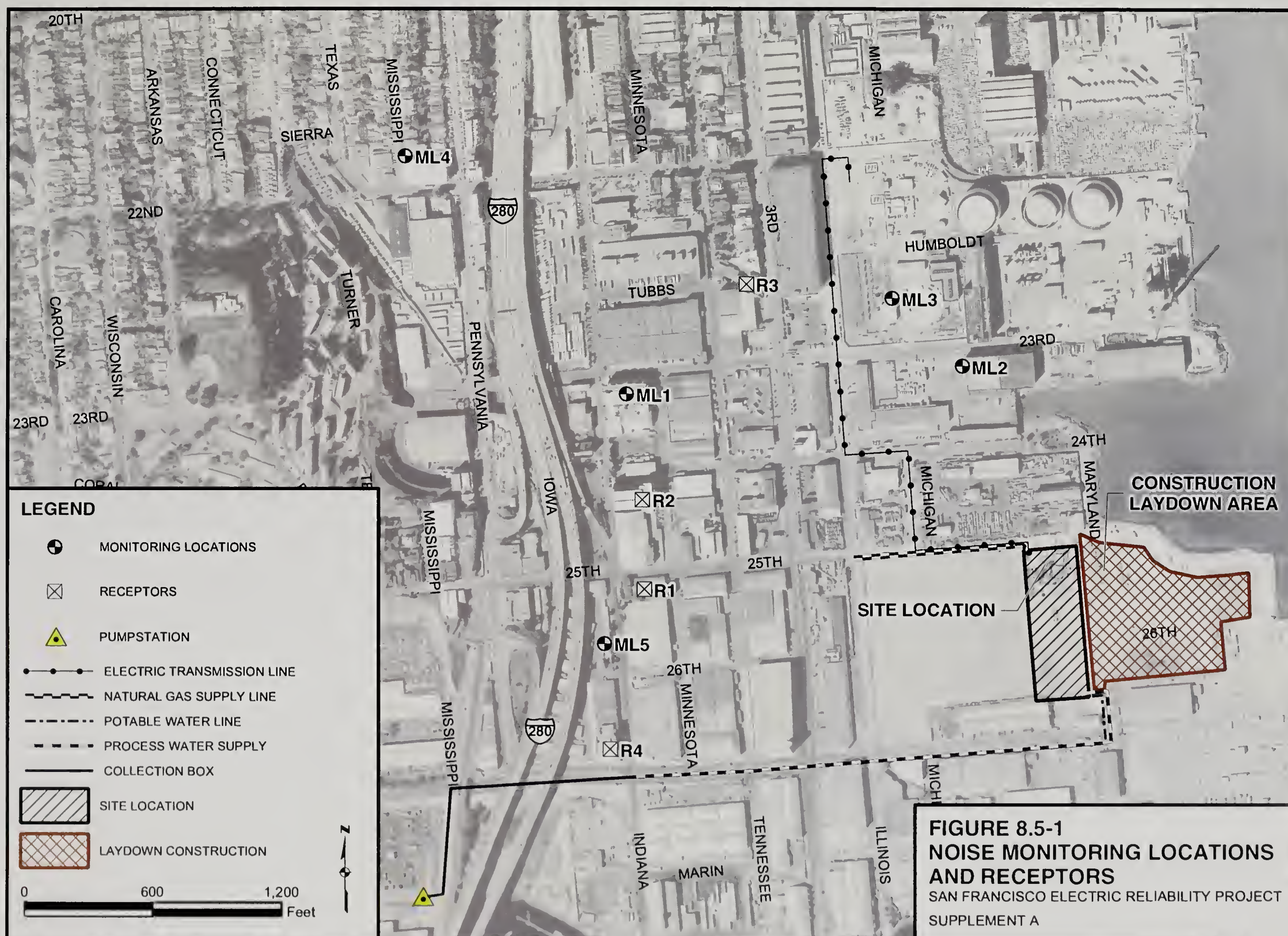

FIGURE 8.5-1
NOISE MONITORING LOCATIONS AND RECEPTORS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

RDD \\RDD40004508\RDDGIS\SFPUC\MXDS\8_5-1_NOISE_MONITORING_SUPPLEMENTA.MXD 3/8/2005 11:28:22

SUBSECTION 8.6

Public Health

8.6 Public Health

8.6.1 Introduction

The City of San Francisco is pursuing the San Francisco Electric Reliability Project (SFERP) to support closure of old dirtier existing generation in the City and hence improve air quality. Nonetheless, the City recognizes that the SFERP will have impacts on the Southeast San Francisco community and is committed to developing a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net public health benefits to the community. Section 4, Environmental Justice, describes these efforts in greater detail.

This subsection presents an assessment of risks to human health potentially associated with operation of the proposed SFERP in accordance with the requirements of the California Energy Commission (CEC). The conclusions from this analysis do not detract from the City's commitment to implement an acceptable PM_{10} mitigation/community benefits package. The subsection focuses on chemical pollutants that could be emitted or released. Air pollutants for which California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS) have been established are also addressed in Subsection 8.1.

The principal concerns for public health are associated with emissions of chemical substances to the air during routine operation of the proposed facility. Chemical substances in air that potentially pose risks to human health include byproducts from the combustion of natural gas.

Combustion byproducts with established CAAQS or NAAQS, including oxides of nitrogen (NO_x), carbon monoxide, sulfur dioxide, and fine particulate matter, are addressed in the Ambient Air Quality subsection (see Subsection 8.1.3). However, some discussion of the potential health risks associated with these substances is presented in this subsection. Human health risks potentially associated with accidental releases of stored acutely hazardous materials at the proposed facility (aqueous ammonia) are also discussed in this subsection.

8.6.2 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this subsection. The relevant laws, ordinances, regulations, and standards (LORS) that affect public health and are applicable to this project are identified in Table 8.6-1. Table 8.6-1 also summarizes the primary agencies responsible for public health, as well as the general category of public health concerns regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations where each of these issues is addressed. Points of contact with the primary agencies responsible for public health are identified in Table 8.6-2.

8.6.3 Affected Environment

The SFERP will be a nominal 145-megawatt (MW) simple-cycle generating facility configured using three natural-gas-fired LM 6000 gas turbines and associated infrastructure. The project will include the construction of a new air-insulated 115-kV switchyard on the

north side of the site, adjacent to 25th Street. Natural gas for the facility will be delivered through a new approximately 900-foot-long, 12-inch-diameter (or less) pipeline that will connect to PG&E's San Francisco Line 101, which is located at the intersection of Illinois and 25th streets. Water for the project would be delivered via a City process water pump station located on Marin Street near Cesar Chavez to a new onsite water treatment plant.

TABLE 8.6-1
Summary of Primary Regulatory Jurisdiction for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Clean Air Act	Public exposure to air pollutants	U.S. Environmental Protection Agency (USEPA) Region IX California Air Resources Board (CARB) Bay Area Air Quality Management District (BAAQMD)	Based on results of risk assessment as per California Air Pollution Control Officers Association (CAPCOA) guidelines, toxic contaminants do not exceed typically used thresholds (see Subsection 8.6.4.2). Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. The impact from increases in emissions of criteria pollutants will be offset (see Subsection 8.6.5.1).
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	Office of Environmental Health and Hazard Assessment (OEHHA)	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings (see Subsection 8.6.4.2).
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX San Francisco Department of Public Health (SFDPH)	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A). A risk management plan (RMP) will be prepared prior to commencement of facility operations (see Subsection 8.6.5.3).
Health and Safety Code Sections 25531 to 25541	Public exposure to regulated substances	SFDPH CARB BAAQMD	An offsite consequent analysis was performed to assess potential risks from a spill or rupture of the aqueous ammonia storage tank (see Subsection 8.6.4.3 and Appendix 8.12A).
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB BAAQMD	Based on results of a risk assessment as per CAPCOA guidelines, toxic contaminants do not exceed typically used thresholds (see Subsection 8.6.4.2).
Environmental Code Chapter 10, Department of Public Works, Order No. 171,378	Particulate matter and other airborne materials have been shown to have an adverse impact on public health	City Agencies awarding contracts and the San Francisco Department of Public Works	The SFPUC will implement dust-reduction measures set forth in the Environmental Code and Order 171,378 during construction of the project.

TABLE 8.6-2
Summary of Agency Contacts for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Clean Air Act	Public exposure to air pollutants	USEPA Region IX CARB BAAQMD	Gerardo Rios, 415-972-3974 Mike Tollstrup, 916-323-8473 Brian Bateman, 415-749-4653
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long 916-445-6900
40 CFR Part 68 (Risk Management Plan)	Public exposure to acutely hazardous materials	USEPA Region IX SFDPH	Gerardo Rios, 415-972-3974 Sue Cone, 415-252-3991
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	SFDPH BAAQMD	Sue Cone, 415-252-3991 Brian Bateman, 415-749-4653
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB BAAQMD	Mike Tollstrup, 916-323-8473 Brian Bateman, 415-749-4653
Department of Public Works, Order No. 171,378	Exposure by the public in general and school children in particular to dust from excavations	San Francisco Department of Public Works	Stanley DeSouza, 415-554-8369

The site (see Figure 2-1) is located on a 4-acre parcel of City-owned land (see Figure 2-1) located between Cesar Chavez and 25th streets, southeast of the intersection of 25th Street and Michigan Street. There are several sensitive receptor facilities (such as schools, day care facilities, convalescent centers, or hospitals) in the vicinity of the project site. The closest of these receptors is the Warm Water Cove Public Access area, a park located approximately 300 feet north of the project site. Sensitive receptors within a 3-mile radius of the project site are shown on Figure 8.6-1, and descriptions of the receptors are presented in Table 8.12-2. Further description of sensitive receptors within a 3-mile radius of the project site is presented in Subsection 8.12, Hazardous Materials.

The terrain within a 10-mile radius of the project is described under separate cover on 7.5-minute U.S. Geological Survey (USGS) Quad maps, five sets of which were previously submitted to the CEC. Figure 8.6-2 provides an index of the 7.5-minute Quad maps within the project vicinity.

8.6.4 Environmental Consequences

Environmental consequences potentially associated with the project are human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed facility include ammonia, volatile organic compounds (VOCs) and polycyclic aromatic hydrocarbons (PAHs) from the combustion turbines, and ammonia and trace metals from the cooling tower. These chemical substances are listed in Table 8.6-3.

TABLE 8.6-3
Chemical Substances Potentially Emitted to the Air

Criteria Pollutants	Noncriteria Pollutants (Toxic Pollutants)	
Carbon monoxide	Ammonia	Xylene
Ozone	Acetaldehyde	Chromium
Sulfur dioxide	Acrolein	Polycyclic aromatic hydrocarbons (PAHs)
Oxides of nitrogen	1,3-Butadiene	Benzo(a)anthracene
Particulate matter	Benzene	Benzo(a)pyrene
	Ethylbenzene	Benzo(b)fluoranthene
	Formaldehyde	Benzo(k)fluoranthene
	Hexane	Chrysene
	Propylene	Dibenz(a,h)anthracene
	Propylene oxide	Indeno(1,2,3-cd)pyrene
	Toluene	Naphthalene
		Arsenic

8.6.4.1 Criteria Pollutants

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in the Ambient Air Quality subsection (see Subsection 8.1.4). The proposed facility will also include emission-control technologies necessary to meet the required emission standards specified for criteria pollutants under Bay Area Air Quality Management District (BAAQMD) rules. Offsets will be provided for emissions of criteria pollutants that exceed specified thresholds to assure that the project will not result in an increase in total emissions in the vicinity. Finally, air dispersion modeling results (presented in the Ambient Air Quality, Subsection 8.1.5.1.2) show that emissions will not result in concentrations of criteria pollutants in the air that exceed ambient air quality standards (either NAAQS or CAAQS), with the exception of the state PM_{10} and the state and federal $PM_{2.5}$ standards. The City, with community input, is in the process of developing a PM_{10} mitigation package.

Potentially sensitive individuals may become exposed to emissions of criteria pollutants from the project. Most of the criteria pollutants are associated with adverse effects to the respiratory system. Therefore, sensitive individuals would consist of individuals with preexisting respiratory diseases such as asthma, bronchitis, or chronic obstructive pulmonary disease. Epidemiological studies have indicated that exposures to elevated levels of criteria pollutants, especially particulate matter and ozone, are associated with a variety

of respiratory and cardiovascular effects. These effects may include aggravation of existing respiratory conditions, such as asthma. Because of concerns for potentially sensitive individuals, the City has obtained an option for local offsets to ensure that impacts on the local community from the SFERP are not offset against benefits to remote communities.

8.6.4.2 Toxic Pollutants

Potential impacts associated with emissions of toxic pollutants to the air from the proposed facility were addressed in a health risk assessment, presented in Appendix 8.1C. The risk assessment was prepared using guidelines developed under the OEHHA, Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, (October 2003) and the BAAQMD "Risk Management Procedure" Policy (1991).

Emissions of toxic pollutants potentially associated with the facility were estimated using emission factors approved by the California Air Resources Board (CARB) and the U.S. Environmental Protection Agency (USEPA). The impact of the SFERP emissions on the concentrations of these pollutants in the air was estimated using dispersion modeling. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a risk assessment, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for noncancer health effects (for noncarcinogenic substances).

The CARB/OEHHA HARP computer program was used to evaluate multipathway exposure to toxic substances. Because of the conservatism (overprediction) built into the established risk analysis methodology, the actual risks will be lower than those estimated.

A health risk assessment requires the following information:

- Carcinogenic potency values for any carcinogenic substances that may be emitted
- Noncancer reference exposure levels (RELs) for determining noncarcinogenic health impacts
- One-hour and annual average emission rates for each substance of concern
- The modeled maximum offsite concentration of each of the pollutants emitted

The SHRA uses carcinogenic potency factors specified by the OEHHA. All of the pollutant cancer risks are assumed to be additive.

An evaluation of the potential noncancer health effects from long-term (chronic) and short-term (acute) exposures has also been included in the SHRA. Many of the carcinogenic compounds are also associated with noncancer health effects and are therefore included in the determination of both cancer and noncancer effects. RELs are used as indicators of potential adverse health effects. RELs are generally based on the most sensitive adverse health effect reported and are designed to protect the most sensitive individuals. However, exceeding the REL does not automatically indicate a health impact. The OEHHA RELs were used to determine any adverse health effects from noncarcinogenic compounds. A hazard index for each noncancer pollutant is then determined by the ratio of the pollutant annual

average concentration to its respective REL for a chronic evaluation. The individual indices are summed to determine the overall hazard index for the project. Because noncancer compounds do not target the same system or organ, this sum is considered conservative. The same procedure is used for the acute evaluation.

Health risks were evaluated for a hypothetical maximum exposed individual (MEI). The hypothetical MEI is an individual assumed to be located at the point where the highest concentrations of air pollutants associated with facility emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed facility are unlikely to be higher at any other location than at the location of the MEI. If there is no significant impact associated with concentrations in air at the MEI location, it is unlikely that there would be significant impacts in any location in the vicinity of the facility.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is defined as the estimated probability of a person contracting cancer as a result of constant exposure to a pollutant over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 70-year lifetime. Evaluation of potential noncancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with RELs (a concentration in air at or below which no adverse health effects are anticipated). RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential noncancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is the hazard quotient. The RELs used to characterize health risks associated with modeled concentrations in air were obtained from the CARB, and are presented in Table 8.6-4.

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Inhalation Cancer Potency Factor $(mg/kg\text{-}day^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	1.0E-02	9.00E+00	—
Acrolein	—	0.06	1.9E-01
Ammonia	—	200	3.2E+03
Arsenic	1.2E+01	5.10E-01	—
Benzene	1.0E-01	60	1.3E+03
1,3-Butadiene	6.0E-01	20	—
Cadmium	1.5E+01	0.02	—
Chromium VI	5.1E+02	2.00E-03	—
Copper	—	—	1.00E+02
Ethylbenzene	—	2,000	—
Formaldehyde	2.1E-02	3.0E+00	9.4E+01
Hexane	—	7,000	—
Lead	4.2E-02	—	—

TABLE 8.6-4
Toxicity Values Used to Characterize Health Risks

Compound	Inhalation Cancer Potency Factor $(mg/kg\text{-}day^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Mercury	—	0.09	1.80E+00
Naphthalene	1.2E-01	9	—
Nickel	9.1E-01	0.05	6.00E+00
Polycyclic aromatic hydrocarbons	1.2E-01 to 2.5E+02	—	—
Propylene	—	3,000	—
Propylene oxide	1.3E-02	3.00E+01	3.10E+03
Silver	—	—	—
Toluene	—	3.00E+02	3.7E+04
Xylene	—	7.00E+02	2.20E+03
Zinc	—	3.50E+01	—

Source: CARB, 2005.

8.6.4.2.1 Toxic Air Pollutant Risks. Excess lifetime cancer risks less than 1 in one million (1×10^{-6}) are not typically considered to represent significant public health impacts that require additional controls of facility emissions. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 8.1C.

The excess lifetime cancer risk associated with concentrations in air for the MEI location is estimated to be 0.046×10^{-6}, based on emissions from operation of the SFERP facility. Note that there is no human habitation at the Chronic and Cancer Risks MEI location. As shown in Figure 8.1C-1, the MEI from SFERP is located in the San Francisco Bay. The excess lifetime cancer risk at the closest inhabited location (a workplace) is 0.0001 in one million. The excess lifetime cancer risk at the closest residence is 0.0008 in one million. The excess lifetime cancer risk associated with concentrations in air estimated for the MEI location based on diesel emissions during construction is expected to be between 0.75 and 1.1 in one million. The MEI location for construction emissions is located very close to the project site, approximately 100 meters from the fenceline. The maximum impact from diesel emissions falls very close to the emissions source; therefore, impacts at other receptor locations are likely to be much lower than projected in this analysis.

A hazard quotient of one as a threshold for noncancer effects is consistent with the guidelines presented in the OEHHA *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA, 2003). The chronic noncancer hazard indices associated with concentrations in air estimated for the MEI location are 0.002, combined across all target organs. The acute noncancer hazard indices summed across all target organs was 0.03, and also fell below one for all target organs.

The detailed methodology for the risk assessment is presented in OEHHA, 2003, and the calculations used to estimate health risks associated with emissions to the air is presented in Appendix 8.1C.

8.6.4.2.2 Characterization of Risks from Toxic Air Pollutants. The estimates of excess lifetime cancer and noncancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have been used to extrapolate from high to low doses. This modeling procedure is designed to provide a conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species) (USEPA, 1986; USEPA, 1996).

An excess lifetime cancer risk of 1×10^{-6} is typically used as a threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, originates from efforts by the U.S. Food and Drug Administration (USFDA) to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt, 1985). The associated dose, known as a "virtually safe dose" (VSD), has become a standard used by many policy makers and the lay public for evaluating cancer risks.

Health risk assessments for toxic air pollutants are prepared conservatively to assure protection of public health. Some of the key assumptions used to assure that risks are estimated in a protective manner include:

- Estimating maximum "worst-case" emissions from the facility. The maximum worst-case emission scenario does not have to be feasible from an operational or economic perspective.
- Estimating the levels (or concentrations) of chemicals in air based on worst-case meteorological conditions, including the wind speeds and direction that would result in the highest concentrations in air from facility emissions.
- Estimating potential human exposure to a hypothetical MEI who is assumed to be located at the point where the highest pollutant concentrations will be found. The MEI is assumed to be located at that point continuously (24 hours/day, 365 days/year) for a 70-year lifetime.
- The MEI is assumed to be exposed through multiple exposure pathways: inhalation, soil ingestion, ingestion of breast milk as an infant, and skin contact with soil.

The estimated lifetime cancer risks to the MEI are less than 1×10^{-6} for air emissions from the SFERP facility, and the aggregated cancer burden associated with this risk level is less than one excess cancer case. The estimated lifetime cancer risk to the MEI from diesel emissions during construction could be slightly higher than 1×10^{-6} at the MEI location; however, the risks at locations with human habitations fall below 1×10^{-6}. The City recognizes that although the impacts from toxic air contaminants from the project are below the levels considered to be significant by regulatory agencies, the highest acute health hazard index from the project will be in Bayview/Hunters Point. To address these concerns, the City is developing, with community input, a community benefits package that will target the mitigation to the areas affected by the impacts from the project.

8.6.4.3 Hazardous Materials

There is the potential for disturbance of hazardous materials during the construction of the SFERP. Also, hazardous materials will be used and stored at the facility. The hazardous materials stored in significant quantities onsite and descriptions of their uses are presented in Subsection 8.12. As described in Subsection 8.13, Waste Management, construction will be required to comply with the requirements of Article 22A of the San Francisco Health Code. In addition, the City will comply with the requirements of the City Environmental Code, Chapter 10, and Order No. 171,378 of the Department of Public Works. The City will also comply with the onsite deed restriction and site-specific Final RMP and Site Management Plan as described in Subsection 8.13, Waste Management.

Use of chemicals at the proposed facility will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate offsite could result in potential impacts to the public.

The California Health and Safety Code Sections 25531 to 25541 and Title 40 Code of Federal Regulations (CFR) Part 68 under the Clean Air Act establish emergency response planning requirements for Regulated Substances. These regulations require preparation of an RMP, which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a regulated substance. The only regulated substance to be used at the facility is aqueous ammonia as discussed in Subsection 8.12. Aqueous ammonia may generate hazardous gases that could migrate offsite when released.

An offsite consequence analysis (OCA) was performed and is included in Appendix 8.12A. The OCA assesses the potential risks to humans at various distances from the site if a spill or rupture of the aqueous ammonia storage tank were to occur. Based on the results of this analysis, a catastrophic release of ammonia from the complete failure of the storage tank would result in ammonia concentrations 2,000 parts per million (ppm) extending offsite approximately 35 feet to the west of the SFERP property line (the location on the MUNI Operations and Maintenance center tracks), 75 ppm ammonia concentrations extending offsite approximately 53 feet, and 25 ppm ammonia concentrations extending 62 feet off the western boundary of the project site. The City's approach to minimize the impacts of these potential concentrations are set forth in Subsection 8.12, Hazardous Materials Handling. Moreover, releases to the north, south, and eastern boundaries of the SFERP (the boundaries accessible to the public) will not exceed a concentration of 5 ppm. At these concentrations, no public health impacts would be expected.

8.6.4.4 Operation Odors

Small amounts of ammonia used to control oxides of nitrogen (NO_x) emissions may escape up the exhaust stack but would not produce operational odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be 10 ppm or lower. After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable. Therefore, potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants are not present at concentrations that could produce objectionable odors. Operation odor from the water treatment facility will be controlled by

enclosing the entire facility in a building and treating all exhaust air with an activated charcoal air filtration system.

8.6.5 Mitigation Measures

As stated earlier, in addition to purchasing local offsets for criteria pollutants, the City, with community input, is developing a PM_{10} mitigation/community benefits package to ensure that the SFERP results in net benefits to public health in San Francisco. Additional features of the SFERP design that are intended to reduce impacts on public health are described here.

8.6.5.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the facility. BACT for the combustion turbine includes the combustion of natural gas.

The project will be required to offset NO_x emissions, and the City has obtained an option for local emission reduction credits to offset both NO_x and POC emissions. In addition, the City is developing a PM_{10} mitigation/community benefits package.

8.6.5.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas as the only fuel at the proposed facility.

8.6.5.3 Hazardous Materials

Mitigation measures for hazardous materials are presented here and discussed in more detail in Subsection 8.12. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. Construction risks will be minimized through compliance with Article 22A of the San Francisco Health Code (as described in Subsection 8.13), Chapter 10 of the Environment Code, and Order No. 171,378 of the San Francisco Department of Public Works. As to operations, the plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The SFERP will include the following design features:

- Curbs, berms, and/or concrete pits will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with the applicable LORS.
- Construction of the aqueous ammonia storage system will be in accordance with applicable LORS.

An RMP for the facility will be prepared prior to commencement of facility operations. The RMP will estimate the risk presented by handling ammonia at the facility. The RMP will include a hazard analysis, offsite consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs and both visual and audible alarms for a potential ammonia release for contractors and operations personnel, including operations personnel at the adjacent MUNI facility to the west of the plant site. Training will include instruction on (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for SFERP personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either an oily waste collection sump or wastewater collection sumps. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

8.6.6 References

Bay Area Air Quality Management District (BAAQMD). 1991 "Risk Management Procedure." May.

California Air Pollution Control Officers Association (CAPCOA). 1993. *Air Toxics "Hot Spots" Program, Revised 1992 Risk Assessment Guidelines*. California Air Pollution Control Officers Association. October.

California Air Resources Board (CARB). 2005. http://www.arb.ca.gov/toxics/healthval/contable.pdf.

Hutt, P.B. 1985. "Use of Quantitative Risk Assessment in Regulatory Decision-Making under Federal Health and Safety Statutes," in *Risk Quantitation and Regulatory Policy*. Eds. D.G. Hoel, R.A. Merrill, and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.

Office of Environmental Health Hazard Assessment (OEHHA). 2003. *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments.* California Office of Environmental Health Hazard Assessment. October.

San Francisco Department of Public Health. 1998. Order No. 171,378.

U.S. Environmental Protection Agency (USEPA). 1986. "Guidelines for Carcinogen Risk Assessment." *Federal Register*. 51:33992. September 24.

U.S. Environmental Protection Agency (USEPA). 1996. *Proposed Guidelines for Carcinogen Risk Assessment.* U.S. Environmental Protection Agency, National Center for Environmental Assessment. EPA/600/P-92/003C. April.

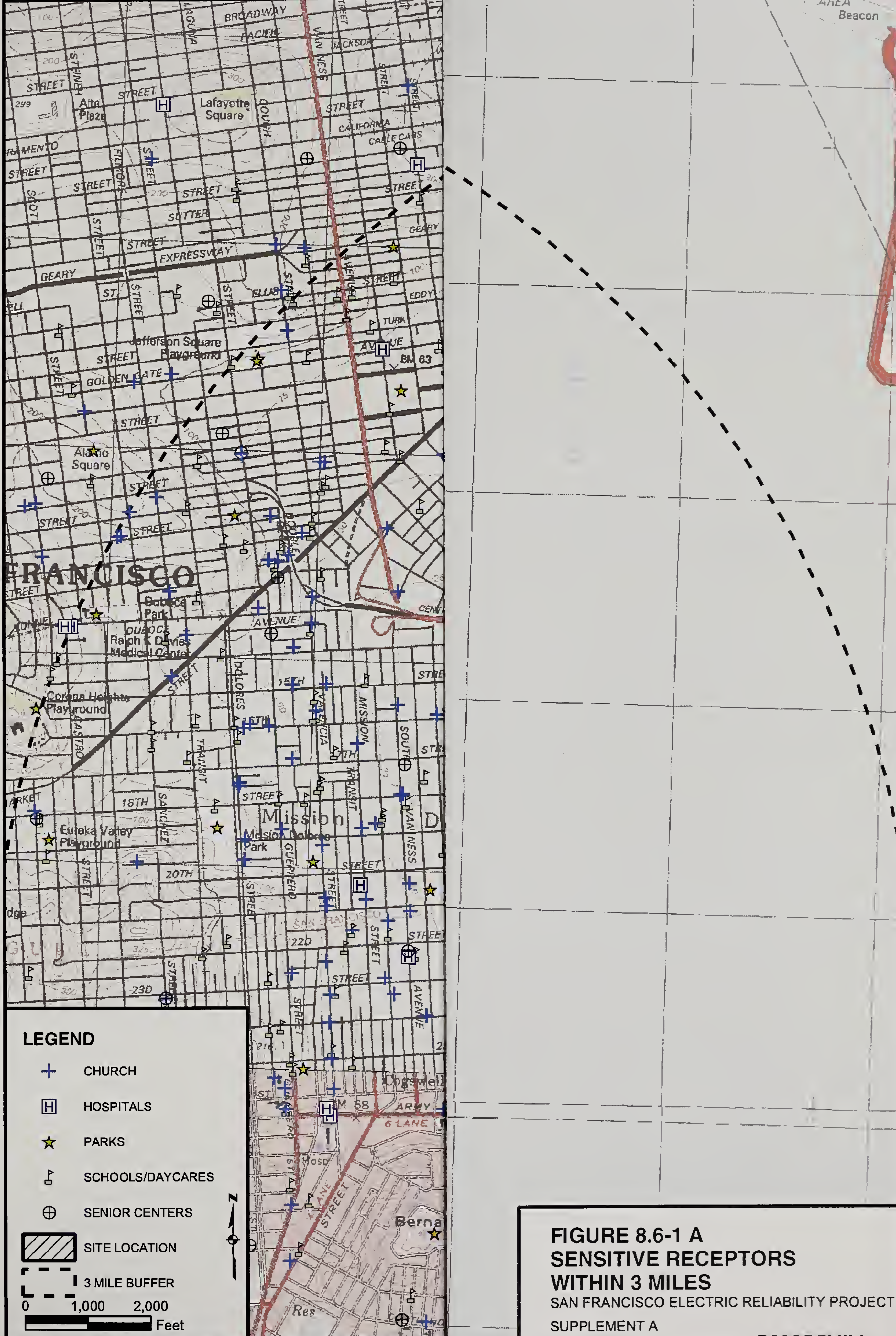

FIGURE 8.6-1 A
SENSITIVE RECEPTORS
WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

FIGURE 8.6-1 A
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

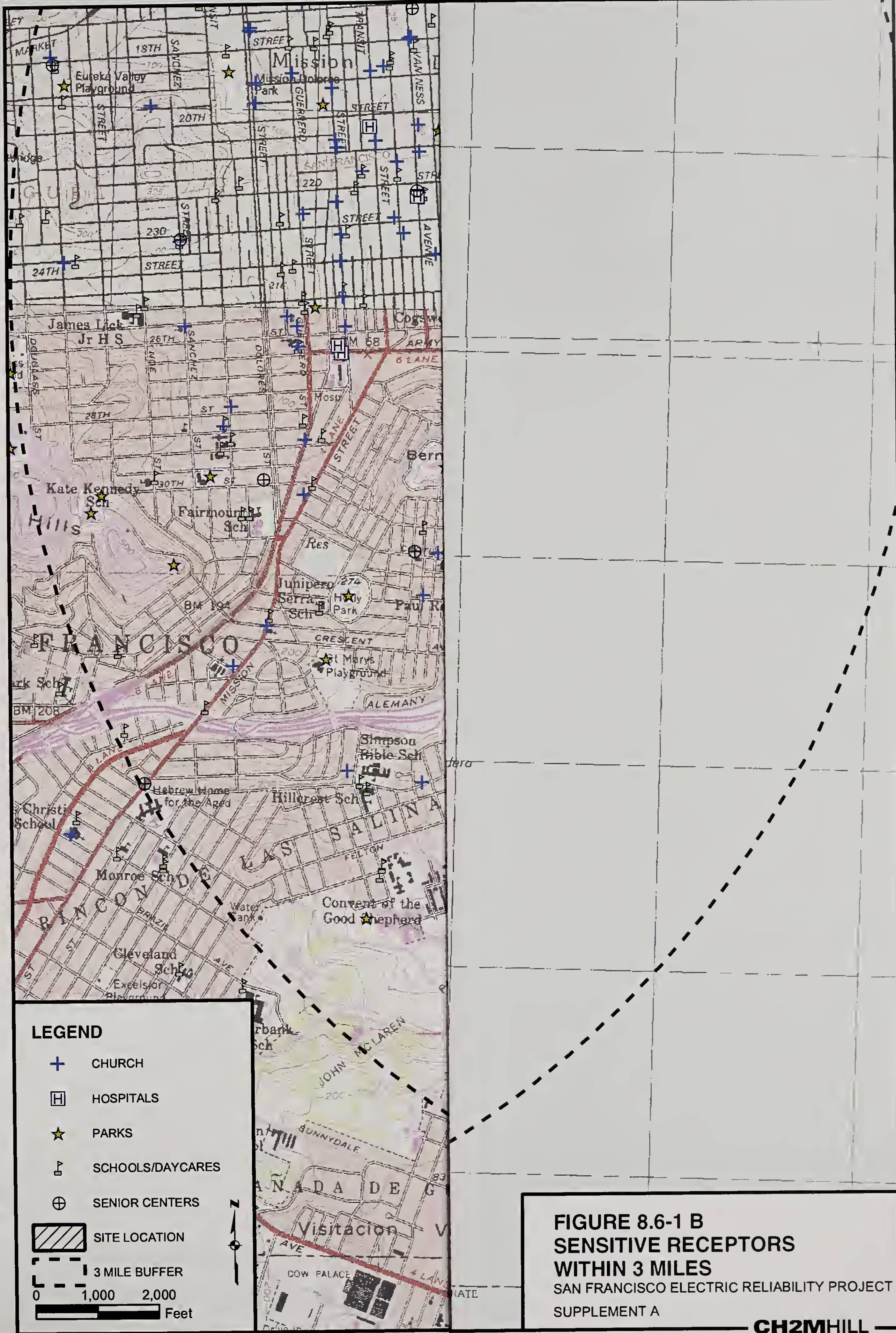

FIGURE 8.6-1 B
SENSITIVE RECEPTORS
WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

FIGURE 8.6-1 B
SENSITIVE RECEPTORS WITHIN 3 MILES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

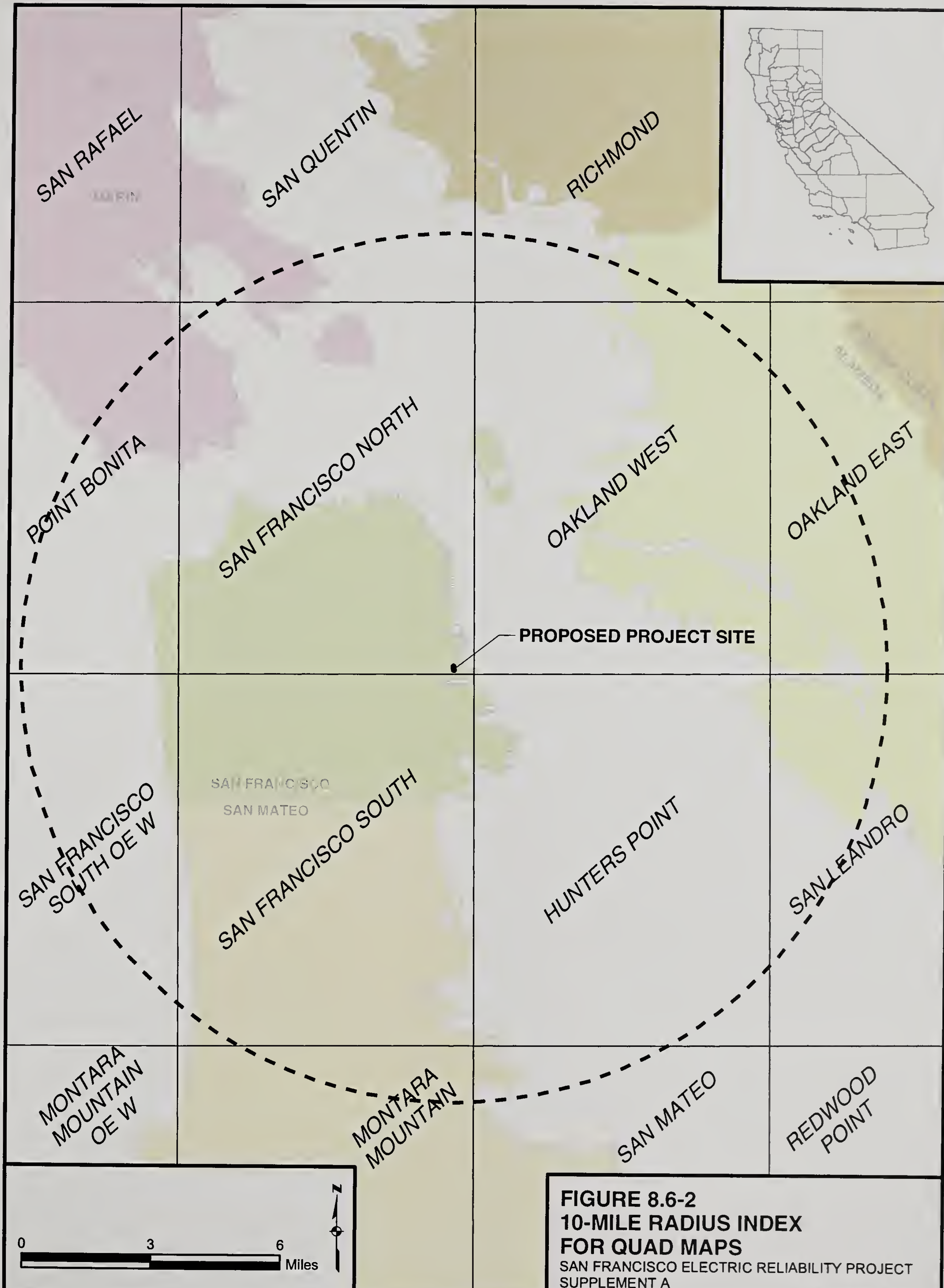

FIGURE 8.6-2
10-MILE RADIUS INDEX FOR QUAD MAPS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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SUBSECTION 8.7

Worker Health and Safety

8.7 Worker Health and Safety

8.7.1 Introduction

Subsection 8.7 summarizes the health and safety issues that may be encountered during the construction and operation of the proposed simple-cycle power plant. The proposed project is called the San Francisco Electric Reliability Project (SFERP) and is located adjacent to the San Francisco Bay in the Potrero District of the City of San Francisco (City), between 25th Street and Cesar Chavez Street, southeast of the intersection of 25th Street and Michigan Street. The plant will be sited adjacent to the proposed MUNI Metro East Maintenance and Operations Center. The plant will consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired LM 6000 turbines and associated infrastructure and equipment.

This section contains worker safety information including the laws, ordinances, regulations, and standards (LORS) that apply to this project. It also contains separate sections outlining the safety training programs and general health and safety programs that will be prepared and implemented for this project, as well as information on the methods to control anticipated hazards, fire protection information, and general information on permitting agencies and contacts. Public health impacts are addressed in Subsection 8.6.

8.7.2 Laws, Ordinances, Regulations, and Standards

SFERP construction and operation will be conducted in accordance with all applicable LORS. Tables 8.7-1 through 8.7-4 summarize the LORS relating to worker health and safety. Table 8.7-1 provides a summary of federal LORS; Table 8.7-2 summarizes the state LORS; Table 8.7-3 lists the local (City and County of San Francisco) LORS; and Table 8.7-4 provides a summary of the applicable national consensus standards. Conformance for federal, state, and local LORS are discussed in Subsection 8.7.4.

TABLE 8.7-1
Federal LORS

Law, Ordinance, Regulation, or Standard	Applicability
Title 29 Code of Federal Regulations (CFR) Part 1910*	Contains the minimum occupational safety and health standards for general industry in the United States
Title 29 CFR Part 1926*	Contains the minimum occupational safety and health standards for the construction industry in the United States

* Primary laws and regulations governing worker health and safety in California are provided in Table 8.7-2. These regulations are for reference and apply as referenced by California occupational safety and health regulations. When a particular situation is not addressed by those regulations, the CFR will be consulted for guidance.

TABLE 8.7-2
State LORS

Law, Ordinance, Regulation, or Standard	Applicability
California Occupational Safety and Health Act, 1970	Establishes minimum safety and health standards for construction and general industry operations in California
8 California Code of Regulations (CCR) 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act
8 CCR 450	Addresses hazards associated with pressurized vessels
8 CCR 750	Addresses hazards associated with high-pressure steam
8 CCR 1509	Addresses requirements for construction, accident, and prevention plans
8 CCR 1509, et seq., and 1684, et seq.	Addresses construction hazards, including head, hand, and foot injuries and noise and electrical shock
8 CCR 1528, et seq., and 3380, et seq.	Requirements for personal protective equipment (PPE)
8 CCR 1597, et seq., and 1590, et seq.	Requirements addressing the hazards associated with traffic accidents and earth-moving
8 CCR 1604, et seq.	Requirements for construction hoist equipment
8 CCR 1620, et seq., and 1723, et seq.	Addresses miscellaneous hazards
8 CCR 1709, et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations
8 CCR 1920, et seq.	Requirements for fire protection systems
8 CCR 2300, et seq., and 2320, et seq.	Requirements for addressing low-voltage electrical hazards
8 CCR 2395, et seq.	Addresses electrical installation requirements
8 CCR 2700, et seq.	Addresses high-voltage electrical hazards
8 CCR 3200, et seq., and 5139, et seq.	Requirements for control of hazardous substances
8 CCR 3203, et seq.	Requirements for operational accident prevention programs
8 CCR 3270, et seq., and 3209, et seq.	Requirements for evacuation plans and procedures
8 CCR 3301, et seq.	Requirements for addressing miscellaneous hazards, including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle-loading dock operations
8 CCR 3360, et seq.	Addresses requirements for sanitary conditions
8 CCR 3511, et seq., and 3555, et seq.	Requirements for addressing hazards associated with stationary engines, compressors, and portable, pneumatic, and electrically powered tools
8 CCR 3649, et seq., and 3700, et seq.	Requirements for addressing hazards associated with field vehicles

TABLE 8.7-2
State LORS

Law, Ordinance, Regulation, or Standard	Applicability
8 CCR 3940, et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment
8 CCR 5109, et seq.	Requirements for addressing construction accident and prevention programs
8 CCR 5110, et seq.	Requirements for the implementation of an ergonomics program
8 CCR 5139, et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding, and spray-coating
8 CCR 5150, et seq.	Requirements for confined space entry
8 CCR 5160, et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances
8 CCR 5192, et seq.	Requirements for conducting emergency response operations
8 CCR 5193, et seq.	Requirements for controlling employee exposure to bloodborne pathogens associated with exposure to raw sewage water and body fluids associated with first aid/CPR duties
8 CCR 5194, et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases
8 CCR 5405, et seq.; 5426, et seq.; 5465, et seq.; 5500, et seq.; 5521, et seq.; 5545, et seq.; 5554, et seq.; 5565, et seq.; 5583, et seq.; and 5606, et seq.	Requirements for flammable liquids, gases, and vapors
8 CCR 5583, et seq.	Requirements for design, construction, and installation of venting, diking, valving, and supports
8 CCR 6150, et seq.; 6151, et seq.; 6165, et seq.; 6170, et seq.; and 6175, et seq.	Fire protection requirements
Title 24, Part 3, California Electrical Code	The Cal/OSHA electrical safety regulations incorporate the requirements of the Uniform Electrical Code located in Title 24, Part 3
8 CCR, Part 6	Provides health and safety requirements for working with tanks and boilers
Health and Safety Code Section 25531, et seq.	Requires that every new or modified facility that handles, treats, stores, or disposes of more than the threshold quantity of any of the listed regulated materials prepare and maintain a Risk Management Plan (RMP)
Health and Safety Code Sections 25500 through 25541	Requires the preparation of a Hazardous Material Business Plan (HMBP) that details emergency response plans for a hazardous materials emergency at the facility

TABLE 8.7-3
Local Laws, Ordinances, Regulations, and Standards Required by San Francisco County

Law, Ordinance, Regulation, or Standard	Applicability
Specific hazardous material handling requirements	Provides response agencies with necessary information to address emergencies
Emergency Response Plan	Allows response agency to integrate SFERP emergency response activities into any response actions
Business Plan	Provides response agency with overview of SFERP purpose and operations
Risk Management Plan (Certified Unified Program Agency [CUPA], administered by the County)	Provides response agency with detailed review of risks and hazards located at SFERP and mitigation implemented to control risks or hazards
Unreinforced Masonry Buildings (UMB), CCSF Building Code, Chapters 16B and 16C	Requires owners of unreinforced masonry buildings to have a structural analysis and if the building does not meet the minimum standards of the code and the exceptions, then the owner will structurally alter the building to conform to the code or have the building demolished
Risk Management Plan and Site Management Plan administered by SFBRWQCB for the MUNI site	Requires development of Worker Safety Plan, dust control measures, and minimization of contact by construction workers with groundwater

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
Uniform Fire Code, Article 80	Addresses the prevention, control, and mitigation of dangerous conditions related to storage, dispensing, use, and handling of hazardous materials and information needed by emergency response personnel
National Fire Protection Association (NFPA) 10, Standard for Portable Fire Extinguishers	Requirements for selection, placement, inspection, maintenance, and employee training for portable fire extinguishers
NFPA 11, Standard for Low-Expansion Foam and Combined Agent Systems	Requirements for installation and use of low-expansion foam and combined-agent systems
NFPA 11A, Standard for Medium- and High-Expansion Foam Systems	Requirements for installation and use of medium- and high-expansion foam systems
NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Requirements for installation and use of carbon dioxide extinguishing systems
NFPA 13, Standard for Installation of Sprinkler Systems	Guidelines for selection and installation of fire sprinkler systems
NFPA 13A, Recommended Practice for the Inspection, Testing, and Maintenance of Sprinkler Systems	Guidance for inspection, testing, and maintenance of sprinkler systems
NFPA 14, Standard for the Installation of Standpipe and Hose Systems	Guidelines for selection and installation of standpipe and hose systems

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
NFPA 15, Standard for Water Spray Fixed Systems	Guidelines for selection and installation of water spray fixed systems
NFPA 17, Standard for Dry Chemical Extinguishing Systems	Guidance for selection and use of dry chemical extinguishing systems
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps	Guidance for selection and installation of centrifugal fire pumps
NFPA 22, Standard for Water Tanks for Private Fire Protection	Requirements for water tanks for private fire protection
NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances	Requirements for private fire service mains and their appurtenances
NFPA 26, Recommended Practice for the Supervision of Valves Controlling Water Supplies	Supervision guidance for valves controlling water supplies
NFPA 30, Flammable and Combustible Liquid Code	Requirements for storage and use of flammable and combustible liquids
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	Fire protection requirements for installation and use of combustion engines and gas turbines
NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites	Fire protection requirements for hydrogen systems
NFPA 54, National Fuel Gas Code	Fire protection requirements for use of fuel gases
NFPA 59A, Standard for the Storage and Handling of Liquefied Petroleum Gases	Requirements for storage and handling of liquefied petroleum gases
NFPA 68, Guide for Explosion Venting	Guidance in design of facilities for explosion venting
NFPA 70, National Electric Code	Guidance on safe selection and design, installation, maintenance, and construction of electrical systems
NFPA 70B, Recommended Practice for Electrical Equipment Maintenance	Guidance on electrical equipment maintenance
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces	Employee safety requirements for working with electrical equipment
NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems	Requirements for installation, maintenance, and use of central station signaling systems
NFPA 72A, Standard for the Installation, Maintenance and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm and Supervisory Service	Requirements for installation, maintenance, and use of local protective signaling systems
NFPA 72E, Standard on Automatic Fire Detection	Requirements for automatic fire detection
NFPA 72F, Standard for the Installation, Maintenance and Use of Emergency Voice/Alarm of Communication Systems	Requirements for installation, maintenance, and use of emergency and alarm communications systems
NFPA 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station and Proprietary Protective Signaling Systems	Testing procedures for types of signaling systems anticipated for facility
NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment	Requirements for fire protection systems used to protect computer systems

TABLE 8.7-4
Applicable National Consensus Standards

Law, Ordinance, Regulation, or Standard	Applicability
NFPA 78, Lightning Protection Code	Lightning protection requirements
NFPA 80, Standard for Fire Doors and Windows	Requirements for fire doors and windows
NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems	Requirements for installation of air conditioning and ventilating systems
NFPA 101, Code for Safety to Life from Fire in Buildings and Structures	Requirements for design of means of exiting the facility
NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants	Guidelines for testing and marking of fire hydrants
NFPA 850, Recommended Practice for Fire Protection for Fossil Fuel Steam Electric Generating Plants	Requirements for fire protection in fossil-fuel steam electric generating plants
NFPA 1961, Standard for Fire Hose	Specifications for fire hoses
NFPA 1962, Standard for the Care, Maintenance, and Use of Fire Hose Including Connections and Nozzles	Requirements for care, maintenance, and use of fire hoses
NFPA 1963, Standard for Screw Threads and Gaskets for Fire Hose Connections	Specifications for fire hose connections
American National Standards Institute/American Society for Mechanical Engineers (ANSI/ASME), Boiler and Pressure Vessel Code	Specifications and requirements for pressure vessels
ANSI, B31.2, Fuel Gas Piping	Specifications and requirements for fuel gas piping

8.7.3 Setting

The project will consist of installing and operating three General Electric LM 6000 Sprint Combustion Turbine Generators (CTGs) equipped with water injection to control oxides of nitrogen (NO_x) emissions. Associated equipment will include a two-cell cooling tower for the inlet air chillers and the necessary emission control systems to meet the proposed air emission limits. Each CTG will generate a nominal 48 MW at International Organization for Standardization (IOS) conditions.

8.7.4 Impacts

8.7.4.1 Environmental Checklist

Impacts would generally be evaluated with respect to the California Environmental Quality Act (CEQA) checklist. The CEQA checklist does not have specific questions for worker health and safety. Related questions are addressed in the Hazardous Materials Management and Noise subsections.

8.7.4.2 Discussion of Impacts

During this project, workers will be exposed to construction safety hazards and plant operation safety hazards. To evaluate these hazards and assess control measures, a hazard analysis has been prepared. The analysis identifies the hazards anticipated during

construction and operation, and indicates which safety programs should be developed and implemented to mitigate and appropriately manage those hazards. The hazard analysis for construction activities is presented in Table 8.7-5; the hazard analysis prepared for plant operation is presented in Table 8.7-6. Since the types of hazards anticipated during plant construction and operation are similar, there is considerable duplication between the tables.

Overview of Hazards and Related Programs and Training. Programs are overall plans that set forth the method or methods that will be followed to achieve particular health and safety objectives. For example, the Fire Protection and Prevention Program will describe what has to be done to protect against and prevent fires. This will include equipment required, such as alarm systems and firefighting equipment, and procedures to follow to protect against fires. The Emergency Action Program/Plan will describe escape procedures, rescue and medical procedures, alarm and communication systems, and response procedures for every hazardous material that can migrate, such as ammonia. The programs or plans are set forth in written documents that are usually kept at specific locations within the facility.

Each program or plan will contain training requirements that are translated into detailed training courses. These courses are taught to plant construction and operating personnel, as needed. For example, all plant operating personnel will receive training in escape procedures under the Emergency Action Program/Plan, but only those working with flammables will receive training under the Fire Protection and Prevention Program.

Tables 8.7-5 and 8.7-6, which list construction and operation activities and associated hazards, also show (under the "Control" column) the program designed to reduce the occurrence of each hazard.

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operation	Same as heavy equipment	Forklift Operation Program
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Prevention Program Scaffolding/Ladder Safety Program Articulating Boom Platforms Program
Use of cranes and derricks	Property damage from falling loads; employee injuries from falling loads; and injuries and property damage from contact with crane or derrick	Crane and Material Handling Program
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program; Housekeeping and Material Handling and Storage Program

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control
Hot work (including cutting and welding)	Employee injury and property damage from fire; exposure to fumes during cutting and welding; ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Safety Program; Respiratory Protection Program; Employee Exposure Monitoring Program; Personal Protective Equipment Program
Demolition of existing structures	Employee injury and property damage associated with falling objects, crushing hazards, and exposure to underground and aboveground utilities	Demolition Safety Procedure
Inspection and maintenance of temporary systems used during construction activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity and energized equipment	Electrical Safety Program; Personal Protective Equipment Program
Exposure to Hazardous Waste	Personnel who are working with or have the potential to be exposed to contaminated soil, groundwater, or debris during construction	Hazardous Waste Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required; Confined-Space Entry Program
General construction activity	Employee injury from hand and portable power tools	Hand and Portable Power Tool Safety Program; Personal Protective Equipment Program
General construction activity	Employee injury/property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program
General construction activity	Employee exposure to occupational noise	Hearing Conservation Program Personal Protective Equipment Program
General construction activity	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General construction activity	Employee injury to head, eye/face, hand, body, foot, and skin	Personal Protective Equipment Program
General construction activity	Employee exposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program; Respiratory Protection Program; Personal Protective Equipment Program; Air Monitoring Program

TABLE 8.7-5
Construction Hazard Analysis

Activity	Hazard*	Control
General construction activity	Employee exposure to various hazards; reporting of hazardous conditions during construction	Injury and Illness Prevention Program
General construction activity	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program
Construction and testing of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program; Electrical Safety Program

* The hazards and hazard controls provided are generic to construction activities. During various phases of construction, a hazard analysis will be performed to more specifically evaluate the relevant hazards and to develop appropriate controls.

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control
Motor vehicle and heavy equipment use	Employee injury and property damage from collisions between people and equipment	Motor Vehicle and Heavy Equipment Safety Program
Forklift operations	Same as heavy equipment	Forklift Operation Program
Trenching and excavation	Employee injury and property damage from the collapse of trenches and excavations	Excavation/Trenching Program
Working at elevated locations	Falls from the same level and elevated areas	Fall Protection Program; Scaffolding/Ladder Safety Program
Use of cranes or derricks	Property damage from falling loads, employee injuries from falling loads, injuries and property damage from contact with crane or derrick	Crane and Material Handling Program
Working with flammable and combustible liquids	Fire/spills	Fire Protection and Prevention Program
Working with hazardous materials	Employee injury due to ingestion, inhalation, dermal contact	Hazard Communication Program
Hot work (including cutting and welding)	Employee injury and property damage from fire; exposure to fumes during cutting and welding; ocular exposure to ultraviolet and infrared radiation during cutting and welding	Hot Work Safety Program; Respiratory Protection Program; Employee Exposure Monitoring Program; Personal Protective Equipment Program; Fire Protection and Prevention Program

TABLE 8.7-6
Operation Hazard Analysis

Activity	Hazard*	Control
Troubleshooting and maintenance of plant systems and general operational activities	Employee injury and property damage from contact with hazardous energy sources (electrical, thermal, mechanical, etc.)	Electrical Safety Program
Working on electrical equipment and systems	Employee contact with live electricity	Electrical Safety Program; Personal Protective Equipment Program
Confined space entry	Employee injury from physical and chemical hazards	Permit-Required; Confined-Space Entry Program
General plant operation activities	Employee injuries from hand and portable power tools	Hand and Portable Power Tool Safety Program; Personal Protective Equipment Program
General plant operation activities	Employee injury and property damage from inadequate walking and work surfaces	Housekeeping and Material Handling and Storage Program
General plant operation activities	Employee overexposure to occupational noise	Hearing Conservation Program; Personal Protective Equipment Program
General plant operation activities	Employee injury from improper lifting and carrying of materials and equipment	Back Injury Prevention Program
General plant operation activities	Employee injury and property damage from unsafe driving	Safe Driving Program
General plant operation activities	Employee overexposure to hazardous gases, vapors, dusts, and fumes	Hazard Communication Program; Respiratory Protection Program; Personal Protective Equipment Program; Employee Exposure Monitoring Program
General plant operation activities	Reporting and repair of hazardous conditions	Injury and Illness Prevention Program
General plant operation activities	Heat and cold stress	Heat and Cold Stress Monitoring and Control Program
General plant operation activities	Ergonomic injuries	Ergonomic Awareness Program
Maintenance and repair of high-pressure steam and air systems	Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	Pressure Vessel and Pipeline Safety Program; Electrical Safety Program
Ammonia storage	Ammonia release	Emergency Action Program/Plan; Risk Management Plan (see Subsection 8.12)

* The hazard and hazard controls provided are generic to operational activities. This hazard analysis may have to be updated if plant operations change or new equipment is added that was not considered during this evaluation.

8.7.4.3 Health and Safety Programs

To protect the safety and health of workers during the construction and operation of the SFERP, health and safety programs designed to mitigate hazards and comply with applicable regulations will be implemented. Periodic audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

The following subsections contain information on the anticipated content of the health and safety programs.

8.7.4.3.1 Construction Health and Safety Program. The following construction safety programs will be developed and implemented during construction of the SFERP as outlined in the following lists.

Injury and Illness Prevention Program

- Philosophy and safety commitment
- Safety leadership and responsibilities
- Accountability
- Specific core safety processes (see Construction Safety Programs later in this section)
- Employee communication
- Planning "job hazard analysis and pre-task"
- Compliance with work rules and safe work practices
- Measurement of compliance and effectiveness of prevention methods
- Communication of performance and implementation of necessary improvements
- Training and other communication requirements

Fire Protection and Prevention Program

- General requirements
- Housekeeping and proper material storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control and containment
- Flammable and combustible liquid storage
- Dispensing and disposal of flammable liquids
- Service and refueling areas
- Training

Personal Protective Equipment Program

- Personal protective devices
- Head protection
- Eye/face protection
- Body protection
- Hand protection
- Foot protection
- Skin protection
- Fall protection
- High-voltage protection

- Respiratory protection
- Hearing protection
- Hazard analysis
- Training

Emergency Action Program/Plan

Emergency procedures for the protection of personnel, equipment, the environment, and materials:

- Fire and emergency reporting procedures
- Response actions for accidents involving personnel and/or property
- Bomb threat response procedures
- Site assembly and emergency evacuation route procedures
- Natural disasters response

Reporting and notification procedures for emergencies and contacts, including offsite and local authorities:

- Alarm and communication systems
- Spill response, prevention, and control action plan
- Emergency response equipment
- Emergency personnel (response team) responsibilities and notification roster
- Training requirements

Construction Safety Programs

Motor Vehicle and Heavy Equipment Safety Program

- Operation and maintenance of vehicles
- Inspection
- Personal Protective Equipment (PPE)
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations
- Safe operating parameters
- Training

Excavation/Trenching Program

- Shoring, sloping, and benching requirements
- California Occupational Safety and Health Administration (Cal-OSHA) permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program

- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program
- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program
- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hazardous Waste Program
- Evaluation of hazard
- Training
- Air monitoring
- Medical surveillance
- Health and Safety Plan (HSP) preparation

Hot Work Safety Program
- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements
- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- Lock-out/tag-out (LO/TO) procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements

- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements
- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing-protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material handling procedures
- Training

Hazard Communication Program
- Labeling requirements
- Storage and handling
- Material Safety Data Sheets (MSDS)
- Chemical inventory
- Training

Respiratory Protection Program
- Selection and use
- Storage
- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program
- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program
- Line-breaking program
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Training

8.7.4.3.2 Operations Health and Safety Program. Upon completion of construction and commencement of operations at SFERP, the construction safety and health program will transition into an operations-oriented program reflecting the hazards and controls necessary during operation. The following outline sets forth the topics that will be included in the Operations Health and Safety Program.

Injury and Illness Prevention Program

- Personnel with the responsibility and authority for implementing the plan
- Safety and health policy
- Work rules and safe work practices
- System for ensuring that employees comply with safe work practices
- Employee communications
- Identification and evaluation of workplace hazards
- Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices, and work procedures in a timely manner based on the severity of the hazards
- Specific safety procedures (see Plant Operation Safety Program)
- Training and instruction

Fire Protection and Prevention Program

- General requirements
- Fire hazard inventory, including ignition sources and mitigation
- Housekeeping and proper materials storage
- Employee alarm/communication system
- Portable fire extinguishers
- Fixed firefighting equipment
- Fire control
- Flammable and combustible liquid storage
- Use of flammable and combustible liquids
- Dispensing and disposal of liquids
- Training
- Personnel to contact for information on plan contents

Emergency Action Program/Plan (Part of the Risk Management Plan)

- Emergency escape procedures and emergency escape route assignments
- Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
- Procedures to account for all employees after emergency evacuation has been completed
- Rescue and medical duties for those employees performing rescue and medical duties
- Fire and emergency reporting procedures
- Alarm and communication system
- Personnel to contact for information on plan contents
- Response procedure for ammonia release
- Training requirements

Personal Protective Equipment Program

- Hazard analysis and prescription of PPE
- Personal protective devices
- Head protection

- Eye and face protection
- Body protection
- Hand protection
- Foot protection
- Skin protection
- Sanitation
- Safety belts and life lines for fall protection
- Protection for electric shock
- Medical services and first aid/bloodborne pathogens
- Respiratory protective equipment
- Hearing protection
- Training

Plant Operation Safety Program

Motor Vehicle and Heavy Equipment Safety Program

- Operation and maintenance of vehicles
- Inspection
- Personal protective equipment
- Training

Forklift Operation Program

- Trained and certified operators
- Fueling operations
- Safe operating parameters
- Training

Excavation/Trenching Program

- Shoring, sloping, and benching requirements
- Cal-OSHA permit requirements
- Inspection
- Air monitoring
- Access and egress

Fall Protection Program

- Evaluation of fall hazards
- Protection devices
- Training

Scaffolding/Ladder Safety Program

- Construction and inspection of equipment
- Proper use
- Training

Articulating Boom Platforms Program

- Inspection of equipment
- Load ratings
- Safe operating parameters
- Operator training

Crane and Material Handling Program
- Certified and licensed operators
- Inspection of equipment
- Load ratings
- Safe operating parameters
- Training

Hot Work Safety Program
- Welding and cutting procedures
- Fire watch
- Hot work permit
- PPE
- Training

Workplace Ergonomics Program
- Identification of personnel at risk
- Evaluation of personnel
- Workplace and job activity modifications
- Training

Employee Exposure Monitoring Program
- Exposure evaluation
- Monitoring requirements
- Reporting of results
- Medical surveillance
- Training

Electrical Safety Program
- Grounding procedure
- LO/TO procedures
- Overhead and underground utilities
- Utility clearance
- Training

Permit-Required Confined Space Entry Program
- Air monitoring and ventilation requirements
- Rescue procedures
- LO/TO and blocking, blinding, and blanking requirements
- Permit completion
- Training

Hand and Portable Power Tool Safety Program
- Guarding and proper operation
- Training

Housekeeping and Material Handling and Storage Program
- Storage requirements
- Walkways and work surfaces
- Equipment handling requirements

- Training

Hearing Conservation Program
- Identifying high-noise environments
- Exposure monitoring
- Medical surveillance requirements
- Hearing-protective devices
- Training

Back Injury Prevention Program
- Proper lifting and material-handling procedures
- Training

Hazard Communication Program
- Labeling requirements
- Storage and handling
- MSDS
- Chemical inventory
- Training

Respiratory Protection Program
- Selection and use
- Storage
- Fit testing
- Medical requirements
- Inspection and repair
- Training

Heat and Cold Stress Monitoring and Control Program
- Monitoring requirements
- Prevention and control

Pressure Vessel and Pipeline Safety Program
- Line-breaking policy
- Equipment inspection and maintenance
- Blocking, bleeding, and blanking
- Communication
- Training

Safe Driving Program
- Inspection and maintenance
- Training

8.7.4.4 Safety Training Programs

To ensure that employees recognize and understand how to protect themselves from potential hazards during this project, comprehensive training programs for construction and operation will be implemented as indicated in Tables 8.7-7 and 8.7-8. Each of the safety procedures developed to control and mitigate potential site hazards will require some form of training. Training will be delivered in various ways, depending on the requirements of

Cal-OSHA standards, the complexity of the topic, the characteristics of the workforce, and the degree of risk associated with each of the identified hazards.

Tables 8.7-7 and 8.7-8 summarize the safety training programs that will be provided to construction and operations personnel, respectively.

TABLE 8.7-7
Construction Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Program/Plan	All
Personal Protective Equipment Training	All
Motor Vehicle and Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment or vehicles
Forklift Operation Training	Employees operating forklifts
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Fall Protection Training	Employees working at heights greater than 6 feet or required to use fall protection
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Crane Safety Training	Employees supervising or performing crane operations
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gases
Hazard Communication Training	Employees handling or working with hazardous materials
Hazardous Waste	Employees handling or excavating hazardous waste
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO or working on systems that require LO/TO activities
Electrical Safety Training	Employees required to work on electrical systems and equipment, or use electrical equipment and cords
Permit-Required Confined-Space Entry Training	Employees required to supervise or perform confined-space entry activities
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees that are exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Training	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All

TABLE 8.7-8
Operations Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Plan	All
Personal Protective Equipment Training	All
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Fall Protection Training	Employees required to use fall protection
Forklift Operator Training	Employees operating forklifts
Crane Safety Training	Employees supervising or performing crane operations
Workplace Ergonomics	Employees performing repetitive activities
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gasses
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing lock out/tag out
Electrical Safety	Employees required to work on electrical systems and equipment
Permit-Required Confined-Space Entry	Employees required to supervise or perform confined-space entry
Hand and Portable Power Tool Safety Training	Employees that will be operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Hazard Communication Training	Employees handling or working around hazardous materials
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Program	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All

8.7.4.5 Fire Protection

Three fire stations are located in the immediate vicinity of the project site and would all respond in the event of a fire emergency. Each station is located within 2 miles of the project site and have a response time of 4 to 6 minutes.

8.7.5 Involved Agencies and Agency Contacts

Several agencies are involved to ensure protection of worker health and safety. Agency contacts relative to worker health and safety and fire are shown in Table 8.7-9.

TABLE 8.7-9
Agency Contacts

Agency	Contact Name/Position	Address and Telephone
SFFD Station 25	Captain Mark Johnson	3305 3rd Street San Francisco, CA 94124 (415) 558-3225
SFFD Station 37	Captain Anthony Russo	789 Wisconsin Street San Francisco, CA 94102 (415) 558-3237
SFFD Station 9	Captain Gregory Stewart	2245 Jerrold Street San Francisco, CA 94125 (415) 558-3209
Environmental Protection Agency	Duty Officer	75 Hawthorne Street San Francisco, CA 94105 (415) 744-1500
Department of Toxic Substance Control	Duty Officer	700 Heinz Avenue Suite 200 Berkeley, CA 94710-2721 (510) 540-2122
Cal-OSHA Consultation—San Francisco Bay Area	Duty Officer	1515 Clay Street Suite 1103 Oakland, CA 94612 (510) 622-2891

8.7.6 Permits Required and Permit Schedule

Table 8.7-10 lists applicable permits related to the protection of worker health and safety for SFERP certification. The activities covered and application requirements to obtain each permit are provided.

All permits noted in Table 8.7-10 may be obtained from any Cal-OSHA district or field office as needed. Notification requirements are listed as 24 hours because the permits may be required at several points in the construction of the plant or during operations; no specific permitting schedule is provided.

TABLE 8.7-10
Health and Safety Permits

Permit or Approval	Schedule	Applicability	Contact
Trenching and excavation permit	Submit completed permit application to any Cal-OSHA district or field office prior to commencing construction	Trenches and excavations of more than 5 feet that personnel are required to enter; **or** construction of buildings, structures, scaffolding, or falsework more than 3 stories high; **or** demolition of any building or structure, or dismantling of scaffolding, or falsework more than 3 stories high	Any Cal-OSHA district or field office
Permit to erect a fixed tower crane	Submit completed permit application to any Cal-OSHA district or field office at least 24 hours prior to initiation of activity	Required to erect, climb, or dismantle fixed tower cranes. Completion of erection of tower crane and commencement of operation **or** climbing of the tower crane, **or** dismantling of the tower crane	Any Cal-OSHA district or field office

SUBSECTION 8.8

Socioeconomics

8.8 Socioeconomics

8.8.1 Introduction

This subsection discusses the environmental setting, consequences, regional and local impacts, and mitigation measures associated with the socioeconomic aspects of the San Francisco Electric Reliability Project (SFERP). Subsection 8.8.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to socioeconomics. Subsection 8.8.3 describes the environment that may be affected by SFERP construction and operation. Subsection 8.8.4 identifies environmental impacts from development of the power plant, and Subsection 8.8.5 discusses cumulative impacts. Environmental justice issues are addressed in Section 4.0, Environmental Justice, and an Environmental Justice analysis is provided in Appendix 8.8A. Mitigation measures are discussed in Subsection 8.8.7. Subsection 8.8.8 presents the agencies involved and provides agency contacts. Subsection 8.8.9 presents the required permits and permitting schedule. Subsection 8.8.10 provides references used to prepare this subsection.

The SFERP project is located between Cesar Chavez and 25th streets, southeast of the corner of Michigan and 25th streets in the Potrero District of the City and County of San Francisco (CCSF). For this project, the region of influence is CCSF.

Land use in the vicinity of the proposed SFERP project site is predominantly industrial to the north, south, and west, with some commercial and residential uses. The San Francisco Bay is located east of the proposed site.

8.8.2 Laws, Ordinances, Regulations, and Standards

A summary of the LORS, including the project's conformance to them, is presented in Table 8.8-1.

8.8.2.1 Federal

Federal LORS are addressed in Section 4.0, Environmental Justice.

8.8.2.2 State

Government Code Sections 65996 and 65997 provide the exclusive methods of considering and mitigating impacts on school facilities that might occur as a result of the development of real property.

Education Code Section 17620, listed in Government Code Section 65997 as an approved mitigation method, allows school districts to levy a fee or other requirement against any construction within the boundaries of the school district for the purpose of funding construction of school facilities.

TABLE 8.8-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Socioeconomics*

LORS	Purpose	Applicability	Conformance
State			
Government Code Sections 65996-65997	Establishes that the levy of a fee for construction of an industrial facility be considered mitigating impacts on school facilities.	SFPUC is exempt because it is a public agency.	Subsections 8.8.4.3.6 and 8.8.4.4.6
Education Code Section 17620	Allows a school district to levy a fee against any construction within the boundaries of the district for the purpose of funding construction of school facilities.	SFPUC is exempt because it is a public agency.	Subsections 8.8.4.3.6 and 8.8.4.4.6
Local			
San Francisco General Plan, Commerce and Industry Element	The objectives of this element are to seek continued economic vitality, social equity and environmental quality	Encourages industry to minimize adverse impacts, expand employment, maintain a favorable social climate	Subsections 8.8.2.3, 8.8.3.3, 8.8.3.4, 8.8.4.3, 8.8.4.4

* See also Section 4.0 for a description of federal and other local LORS.

8.8.2.3 Local

8.8.2.3.1 San Francisco General Plan: Commerce and Industry Element. The Commerce and Industry Element of the General Plan describes objectives and policies to enhance economic vitality, promote social equity, and maintain or enhance environmental quality. Three of the four objectives are relevant to Socioeconomics. Objective 1 is to manage economic growth so as to enhance the city's living and working environment. Objective 2 is to maintain and enhance the City's economic base and fiscal structure. Objective 3 is to provide expanded employment opportunities.

The project complies with Objective 1, Policies 1.1 and 1.2, since the development of this power plant will provide net benefits (e.g., reliable power, support closure of in-City generation) and minimize undesirable consequences. Compliance with Objectives 2 and 3 are addressed in Subsections 8.3 and 8.4

8.8.2.3.2 Ordinance No. 124-01, Resolution 827-02 and Resolution 458-03. These LORS are discussed in Section 4, Environmental Justice.

8.8.3 Affected Environment

8.8.3.1 Population

San Francisco is bordered to the north by Marin County, to the south by San Mateo County, and to the east by the San Francisco Bay (Bay). In addition to San Mateo and Marin counties, San Francisco is in close proximity to the following six counties: Alameda, Contra Costa, Napa, Santa Clara, Solano, and Sonoma. The preceding nine counties are economically linked and are thus generally referred to as the nine-county Bay Area.

As shown in Table 8.8-2, with a January 1, 2004 estimated population of 792,700, and a projected population of 796,200 by the year 2030 (DOF, 2005a). As shown in Table 8.8-3, the average annual compounded growth rate for the period of 2000-2010 is estimated at 0.5 percent, compared to a growth rate for the State of 1.3 percent. This means that population growth in San Francisco will be almost stagnant during that 10-year period.

As shown in Table 8.8-3, the annual average population growth rate has been decreasing since 1990. According to the projections, sometime after the second decade of this century (between 2020 and 2030), there will be a greater population outflow than inflow. In other words, more residents will move out of San Francisco than move in. This out-migration is expected to continue until at least 2050. The California Department of Finance projects that in 2050, San Francisco will have a population of 706,190—a population level close to what it had in 1984 (DOF, 2003a).

TABLE 8.8-2
Historical and Projected Populations*

Area	1990	1995	2000	2010(p)	2020(p)	2030(p)
San Francisco	723,959	751,899	776,733	816,200	820,500	796,200
California	29,758,213	31,910,061	34,480,300	39,246,767	43,851,741	48,110,671

Source: DOF, 2005a.
* Projected populations rounded to nearest 100.
(p) = projected

TABLE 8.8-3
Historical and Projected Annual Average Compounded Population Growth Rates

Area	1990-1995	1995-2000	2000-2010	2010-2020	2020-2030
San Francisco	0.8%	0.7%	0.5%	0.05%	-0.3%
California	1.4%	1.6%	1.3%	1.1%	0.9%

8.8.3.2 Housing

As shown in Table 8.8-4, housing stock for San Francisco as of January 1, 2004, was 354,490 units. Single-family homes accounted for 111,635 units, multiple-family dwellings accounted for 242,295 units, and mobile homes accounted for 560 units (DOF, 2005b). New housing authorizations for San Francisco in 2003 totaled 1,582 units; about 95 percent were multi-family and 5 percent were single-family units. These authorizations were valued at \$546.8 million (DOF, 2005c). Fourth quarter 2004 median home price in San Francisco Bay Area was \$656,700 (Bankrate.com, 2005). Housing availability, as measured by vacancy rate, has declined between 1990 (about 7 percent) and 2004 (about 4.8 percent). Housing demand has typically exceeded supply in San Francisco and continues to do so despite the economic downturn heralded by the "dotcom" bubble burst of 2000 and historically low interest rates (SFCED, 2003).

TABLE 8.8-4
Housing Estimates by County and State, January 1, 2004

Area	Total Units	Single-Family	Multi-Family	Mobile Homes	Percent Vacant
San Francisco	354,490	111,635	242,295	560	4.8
California	12,759,585	8,216,731	3,965,206	577,648	5.8

Source: DOF, 2005b.

8.8.3.3 Economy and Employment

San Francisco is in the San Francisco Primary Metropolitan Statistical Area (PMSA), which is comprised of the counties of San Francisco, San Mateo and Marin. Between 1999 and 2003, employment in the San Francisco PMSA decreased by 87,300 jobs or about 8 percent. California experienced a net increase of 3 percent during that same period (CEDD, 2005a). As shown in Table 8.8-5, the Construction and Government sectors were the only sectors that experienced an increase in employment. Although employment in Construction increased between 1999 and 2003, the contribution of this sector to the San Francisco PMSA economy remained relatively small (5 percent).

TABLE 8.8-5
Employment Distribution in San Francisco PMSA, 1999 to 2003

	1999		2003		1999-2003	
Industry	Number of Employees	Employment Share (%)	Number of Employees	Employment Share (%)	Percentage Change (%)	Average Annual Compound Growth Rate (%)
Agriculture	3,600	0	3,600	0	0	0.0
Natural Resources, Mining	300	0	200	0	-33	-9.6
Construction	42,900	4	43,600	5	2	0.4
Manufacturing	63,100	6	45,500	5	-28	-7.8
Wholesale Trade	33,000	3	27,800	3	-16	-4.2
Retail Trade	97,600	9	95,100	10	-3	-0.6
Transportation, Warehousing and Utilities	57,100	5	46,200	5	-19	-5.2
Information	48,500	5	47,000	5	-3	-0.8
Financial Activities	97,000	9	90,700	9	-6	-1.7
Services	475,100	46	425,700	45	-10	-2.7
Government	125,500	12	131,000	14	4	1.1
Total Employment	1,043,700	100	956,300	100	-8	-2.2

Source: CEDD, 2005a.

Table 8.8-6 provides details about the characteristics of the San Francisco PMSA labor force. It shows 2003 employment data for the San Francisco PMSA and the nine-county Bay Area compared to California. Both the San Francisco PMSA and the nine-county Bay Area have unemployment rates that are lower than the State average. The California Employment Development Department (CEDD) does not forecast future unemployment rates.

TABLE 8.8-6
Employment Data, 2003

Area	Labor Force	Employment	Unemployment	Unemployment Rate (%)
San Francisco PMSA	903,400	852,100	51,300	5.7
Nine-county Bay Area	3,607,300	3,374,300	233,000	6.5
California	17,460,000	16,282,700	1,177,300	6.7

Source: CEDD, 2005a.

8.8.3.4 Fiscal Resources

The only relevant local agency with taxing power is CCSF. San Francisco's expenditures and revenues for fiscal years (FY) 2001 and 2002 are presented in Table 8.8-7. Its revenues have been fluctuating for the past few years. From FY 2001 to FY 2002, San Francisco's revenues grew 5 percent. In FY 2003, the revenues were expected to decline by about 4 percent. The decline in revenue is attributable to the overall sluggish economy and the state deficit (which is responsible for the 5.3 percent decrease in intergovernmental transfers between FY 2002 and 2003).

TABLE 8.8-7
City and County of San Francisco Revenues and Expenditures ($ million)

	FY 2001	FY 2002	Proposed FY 2003
Expenditures			
Salaries and Wages	$1,818	$1,954	$1,972
Fringe Benefits	$440	$464	$415
Overhead	$38	$43	$56
Professional & Contractual Services	$1,185	$1,172	$1,162
Aid Assistance	$297	$362	$371
Materials and Supplies	$183	$172	$186
Equipment	$46	$49	$50
Debt Service	$463	$584	$527
Services to Other Departments	$396	$408	$449
Expenditure Recovery	($481)	($533)	($602)
Budgetary Reserves	$91	$58	$42
Facilities Maintenance	$13	$11	$12
Capital Projects	$285	$257	$153

TABLE 8.8-7
City and County of San Francisco Revenues and Expenditures ($ million)

	FY 2001	FY 2002	Proposed FY 2003
Total Expenditures	$4,773	$5,001	$4,790
Revenues			
Taxes	$1,367	$1,453	$1,439
Taxes – Property Taxes	$690	$702	$715
Taxes – Business	$675	$748	$721
Taxes – Other Local	$2	$3	$3
Licenses, Fines and Penalties	$108	$102	$150
Use of Money or Property	$327	$334	$326
Intergovernmental	$1,013	$1,064	$1,008
Charges for Services	$1,413	$1,543	$1,585
Other Revenues	$174	$173	$84
Fund Balance	$372	$333	$198
Total Revenue	**$4,773**	**$5,001**	**$4,790**

Source: City and County of San Francisco, 2003.
Numbers may not add up due to independent rounding.

Table 8.8-8 summarizes CCSF's general fund revenues and expenditures for the last 3 fiscal years. These estimates are different from those shown in Table 8.8-7, which were for all funds. Total revenues have been rising over the last 3 fiscal years with most of those increases being in taxes, specifically property taxes and transfers in. Property taxes increased by approximately 3 percent between FY 2002-03 and FY 2003-04 and by about 22 percent between FY 2003-04 and the current fiscal year (FY 2004-05). Transfers in have increased from about 2 percent (FY 2002-03 to FY 2003-04) to about 3 percent (FY 2003-04 and FY 2004-05). The decline in revenue is attributable to the overall sluggish economy and the state deficit (which is responsible for the 7 percent decrease in intergovernmental transfers between FY 2002-03 and FY 2003-04 and the almost 13 percent between FY 2003-04 and FY 2004-05).

Expenditures on all categories have been fluctuating over the last 3 fiscal years. Non-personnel expenditures increased by approximately 12 percent between FY 2002-03 and FY 2003-04 and declined by about 38 percent between FY 2003-04 and the current fiscal year (FY 2004-05). Personnel expenditures, on the other hand, decreased by about 12 percent between FY 2002-03 and FY 2003-04 and increased by about 14 percent between FY 2003-04 and the current fiscal year (FY 2004-05). All other expenditure categories declined over the 3 fiscal year periods.

TABLE 8.8-8
City and County of San Francisco General Fund Revenues and Expenditures ($ Millions)

	FY 2002-2003	FY 2003-2004	FY 2004-2005
Expenditures			
Personnel	$1,050	$929	$1,058
Non-personnel	$640	$719	$446
Revenue Transfers Out	$279	$0	$0
Services to Other Departments	$136	$132	$96
Budgetary Reserves	$53	$31	$0
Equipment Purchases	$13	$9	$21
Capital Improvements & Facilities Maintenance	$15	$7	$0
Debt	$7	$0	$2
Recoveries	$0	$185	$0
General Fund Contribution Transfer	$0	$232	$289
Aid/City Grants	$0	$0	$359
Reserves	$0	$0	$65
Total Expenditures	**$2,193**	**$2,245**	**$2,336**
Revenues			
Taxes	$1,183	$1,188	$1,322
Taxes – Property Taxes	$513	$528	$645
Taxes – Business	$282	$289	$295
Taxes – Other Local	$388	$371	$381
Franchise Tax	$11	$0	$0
Licenses & Permits	$6	$17	$16
Fines, Forfeitures & Penalties	$4	$32	$12
Interest Income	$17	$13	$6
Rents & Concessions	$18	$20	$22
Intergovernmental	$685	$657	$610
Service Charges	$91	$107	$102
Recoveries	$10	$0	$18
Other Revenues	$38	$19	$28
Transfers In	$131	$133	$136
Fund Balance	$0	$0	$0
Other Financing Sources	$0	$2	$1
ISF Charges for Services	$0	$0	$0

TABLE 8.8-8
City and County of San Francisco General Fund Revenues and Expenditures ($ Millions)

	FY 2002-2003	FY 2003-2004	FY 2004-2005
Non-ISF Charges for Services	$0	$0	$0
Previous Year Fund Balance & Reserves	$0	$58	$63
Recoveries	$0	$0	$0
Total Revenue	**$2,193**	**$2,245**	**$2,336**

Source: City and County of San Francisco, 2005; Lewis, 2005.
Numbers may not add up due to independent rounding.

8.8.3.5 Education

The SFERP site is within the boundaries of the San Francisco Unified School District, which has a total of 114 elementary, middle, and high schools. The closest schools to the project site include Enola Maxwell Middle School (655 DeHaro Street), the Starr King Elementary School (1215 Carolina Street), Daniel Webster Elementary School (465 Missouri Street), Creative Arts Charter (K-8) School (1802 19th Street), and International Studies Academy High School (693 Vermont Street). Current, as well as projected, enrollment figures for the combined San Francisco Unified School District (which includes the above five schools) are presented in Table 8.8-9. As shown in the table, the current enrollment levels for the School District have increased by 1,431 students (or 2 percent) over the prior year while the combined enrollment in the five schools have declined (about 8 percent, or 110 students) from what they were during the 2003-04 school year.

TABLE 8.8-9
Current and Projected Enrollment by Grade

	San Francisco Unified School District			International Studies Academy HS, Creative Arts Charter K-8, Enola Maxwell MS[a], Starr King ES, & Daniel Webster ES combined		
Grade Level	Enrollment in 2003-04	Current Enrollment (2004-05)	Projected Enrollment[b] (2005-06)	Enrollment in 2003-04	Current Enrollment (2004-05)	Projected Enrollment[b] (2005-06)
Kindergarten	4,044	4,059		91	102	99
First	4,285	4,060		84	87	99
Second	4,234	4,233		103	95	86
Third	4,272	4,219		116	92	96
Fourth	4,428	4,316		99	101	92
Fifth	4,364	4,462		109	118	100
Sixth	4,412	4,225		75	64	65
Seventh	4,272	4,369		95	80	64
Eighth	4,361	4,251		68	98	78

TABLE 8.8-9
Current and Projected Enrollment by Grade

Grade Level	San Francisco Unified School District			International Studies Academy HS, Creative Arts Charter K-8, Enola Maxwell MS[a], Starr King ES, & Daniel Webster ES combined		
	Enrollment in 2003-04	Current Enrollment (2004-05)	Projected Enrollment[b] (2005-06)	Enrollment in 2003-04	Current Enrollment (2004-05)	Projected Enrollment[b] (2005-06)
Ungraded Elementary & Pre-Kindergarten		1,371			0	0
Ninth	5,178	5,486			135	136
Tenth	5,256	5,198			129	136
Eleventh	4,606	4,704			109	106
Twelfth	4,093	4,252			102	91
Other (Ungraded Secondary)		31			0	0
Total	**57,805**	**59,236**		**840**	**1,312**	**1,248**

Source: ED-Data, 2005; Fillingim-Selk, 2005.
ES = Elementary School
MS = Middle School
HS = High School
[a] Enola Maxwell MS was formerly known as Potrero Hill MS.
[b] Projected enrollment numbers are currently not available.

8.8.3.6 Public Services and Facilities

8.8.3.6.1 Law Enforcement. The proposed SFERP project site is under the jurisdiction of the San Francisco Police Department (SFPD). The SFPD station closest to the proposed project site is the Bayview Station located at 201 Williams Avenue, San Francisco. The Bayview station has approximately 150 sworn officers: one captain, 4 lieutenants, 15 sergeants and approximately 110 patrol officers. There are 5 patrol cars that patrol the 5 sectors served by the Bayview Station. The station provides night and daytime patrols with 1 or 2 officers per patrol car (Bruce, 2005).

All calls to the station are routed through the SFPD Emergency Communication Dispatch Center. The SFPD uses a prioritization system whereby calls are categorized as either A, B or C. The response time to an emergency call depends on the priority of the call. Calls categorized as 'A' (e.g., crimes in progress such as burglary, assault, shooting, stabbing, etc.) are typically responded to within 2 minutes. Response times to 'B' calls are longer than 2 minutes; whereas, 'C' calls are responded when convenient. 'B'-type calls are those involving crimes that have already happened; e.g., a burglary has already occurred and an officer is required to take a report. 'C'-type calls are those typically dealing with minor infractions (Puccinelli, 2004).

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation, and the management of hazardous materials spill incidents.

8.8.3.6.2 Fire Protection. The SFERP site is within the San Francisco Fire Department (SFFD) jurisdiction. SFFD Station No. 25 located at 3305 Third Street is the closest station to the SFERP site. The second and third closest stations to the SFERP site are No. 37 located at 798 Wisconsin and No. 9 located at 2245 Girard.

The SFFD staffs each of these stations with one officer and three firefighters at all times, and equips each station with one engine. Thus, Station Nos. 25 and 37 each have one engine staffed by an officer and three firefighters while Station No. 9 is comprised of an Engine Company (one engine and three firefighters), a Truck Company (one truck, one officer and 4 firefighters) and an Ambulance. The average response time to a call is approximately 3 to 4 minutes for all stations in the department (Juarez, 2004; Reyes, 2005; Tingin, 2005; Wong, 2005).

In the event of a fire at the site, SFFD would determine whether additional units were necessary, and call in other stations, as needed.

8.8.3.6.3 Emergency Response. SFFD has a Hazardous Materials (Haz Mat) Response Team made up of members of Engine Company 36 (Station No. 36 located at 109 Oak Street) and is backed up by the members of Rescue Squads 1 and 2. The chief officers of Battalion 2 are responsible for coordinating all emergency operations. Further support is given to the unit by inspectors from the hazardous materials permit section of the Bureau of Fire Prevention, industrial hygienists, environmental health inspectors from the Department of Public Health, and the Coast Guard. The normal "emergency response" for the hazardous materials team is Battalion 2, Haz Mat 1, and a staff member from the Health Department. Sixty-one members of the San Francisco Fire Department are certified Hazardous Materials Specialists. Twenty-five of these members work at Station 36 (SFFD, 2004).

The Haz Mat team response time to an emergency at the proposed project site is approximately 30 minutes. They are capable of handling any emergency involving spills, e.g., aqueous ammonia.

8.8.3.6.4 Hospitals. The Potrero Hill Health Center, a clinic that is part of the Community Health Network of San Francisco (CHN), is located at 1050 Wisconsin in the Potrero Hill neighborhood, about 0.8 mile from the project site. San Francisco General Hospital, the closest full-service hospital, is located approximately 1.4 miles from the project site. Concentra Medical Center (formerly Mission Bay Occupational Care Center), a workers' compensation clinic that provides services to employers, is located approximately 0.6 mile from the proposed project site at 728 20th Street. In addition, there are several emergency and urgent care facilities within a short distance of the project site.

8.8.3.7 Utilities

8.8.3.7.1 Electricity and Gas. The project will connect to power grid through the PG&E Potrero Substation by two redundant three-phase 115-kV solid dielectric underground transmission circuits. The total transmission distance will be less than 3,000 feet (see Section 5.0, Electric Transmission).

Natural gas for the facility will be provided by PG&E. A pipe tie-in will be made to the existing PG&E San Francisco Line 101, located at the intersection of Illinois and 25th streets. The gas line will be approximately 900 feet long, 12 inches (or less) diameter, and will run

along the north side of the property along 25th Street. Gas supply is described in Section 6.0, Natural Gas Supply.

8.8.3.7.2 Water. Potable water for drinking, safety showers, fire protection water, service water, and sanitary uses will be provided via a city main located about 300 feet away on Cesar Chavez Street (see Figure 2-1). Water for process and cooling, equipment wash water, and the dual plumbing system (toilets) would be recycled water produced onsite. The City will provide untreated process water from a process water pumping station (WPS) to be constructed on Marin Street near Mississippi Street. A new pipeline will be installed along Marin, Mississippi, and east on Cesar Chavez Street to convey the process water to a new water treatment system located on the southern portion of the project site. The 0.76 mile pipeline will connect the WPS to the facility, where it will be treated onsite to Title 22 recycled water standards. Approximately 1,300 feet of the pipeline will be installed within an existing collection box. The remaining portion will be new trenched construction with the exception of possible jack and bore construction under 3rd Street and Illinois Street. The water supply system is described in Subsection 8.14, Water Resources.

8.8.3.7.3 Wastewater Discharge. Plant wastewater would be discharged to the combined sewer system as permitted under the discharge permit to be obtained from the City under Article 4.1 of the San Francisco Public Works Code.

Sanitary wastewater generated at SFERP, estimated at 1 gpm average and 2 gpm maximum, will also be discharged to the combined sewer system. This volume would be considered a *de minimus* increase in demand on the combined sewer system, not measurable within the overall dry weather flow (average 68 MGD) and well within the treatment, conveyance and disposal capacities of the City's system. See subsection 8.14.5, in Water Resources, for more information about plant discharges.

8.8.4 Environmental Consequences

This subsection assesses the potential environmental impacts of the project and linears.

8.8.4.1 Potential Environmental Impacts

Local environmental impacts were determined by comparing project demands during construction and operation with the socioeconomic resources of the project area (i.e., San Francisco). A proposed power-generating facility could impact employment, population, housing, public services and utilities, and/or schools. Impacts could be local and/or regional, although most socioeconomic impacts would tend to be more regional than local. As discussed in this subsection, generally, it is anticipated that the project will not have any significant adverse impacts on the socioeconomic environment, and it will have some socioeconomic benefits to the local community. However, as is stated in Ordinance No. 124-01, Southeast San Francisco has been recognized as a minority community entitled to environmental justice and all in-City electric power generation is currently located in Southeast San Francisco. The Environmental Justice Issues are described in Section 4.0, Environmental Justice.

8.8.4.2 Significance Criteria

Section 15131 of the CEQA Guidelines suggests the following criteria are to be used to determine the significance of project-related socioeconomic impacts.

- Economic or social effects of a project shall not be treated as significant effects on the environment.
- Economic or social factors of a project may be used to determine the significance of physical changes caused by the project.
- Economic, social, and particularly housing, factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment.

8.8.4.3 Construction Impacts

Construction is planned to take place over a 12-month period, which is expected to occur from second quarter 2006 to the second quarter 2007. Plant testing and commercial operation are planned to commence in the second quarter of 2007.

8.8.4.3.1 Construction Workforces. The primary trades in demand will include boilermakers, carpenters, electricians, ironworkers, laborers, millwrights, operators, and pipefitters. Table 8.8-10 shows the construction personnel requirements for the plant and linear facilities. Total personnel requirements during construction of the plant will be approximately 1,931 person-months, or 161 person-years. Construction personnel requirements for the plant, underground transmission line and water line will peak at approximately 264 workers during the 6th month of the construction period.

The availability of skilled labor in San Francisco was evaluated by surveying a number of labor unions (Table 8.8-11) and by contacting CEDD (Tables 8.8-12 and 8.8-13). Both sources show that the workforce in San Francisco as well as that in the San Francisco PMSA and the greater Bay Area will be adequate to fulfill SFERP's labor requirements for construction. In addition, as shown in Table 8.8-5, the construction workforce within the San Francisco PMSA has been growing at a small but positive average annual rate of 0.4 percent per year. Therefore, SFERP construction will not place an undue burden on the local workforce.

8.8.4.3.2 Population Impacts. It is anticipated that most of the construction workforce will be drawn first from the San Francisco PMSA and then from the nine-county Bay Area. Most workers are expected to commute to the project site, and therefore, will not contribute to an increase in the population of the area.

8.8.4.3.3 Housing Impacts. The construction workforce will most likely commute to the project site daily; however, if needed, there are about 244 hotels/motels with over 34,800 rooms in San Francisco to accommodate workers who may choose to commute to the project site on a workweek basis. In 2004, the average hotel/motel vacancy rate in San Francisco was about 30 percent, while the average room rate was $131 per night (Strong, 2005). In addition to the available hotel/motel accommodations, there are over 50 recreational vehicle (RV) parks within 20 miles of the proposed project site. As a result, construction of the proposed project is not expected to impact housing supply. Potential impacts of the SFERP on housing development in Southeast San Francisco are addressed in Subsection 8.4, Land Use.

TABLE 8.8-10
Construction Personnel by Month

Discipline	Months After Notice to Proceed												Total
	1	2	3	4	5	6	7	8	9	10	11	12	
Power Plant													
Boilermakers			10	30	38	38	38	38	30	6	3		231
Bricklayers/Masons			2	3	3	3	3	3	2	2			21
Carpenters		4	7	7	7	7	7	7	7	4	3		60
Electricians		16	25	35	35	38	38	38	38	30	10	1	304
Insulation Workers			2	9	12	12	12	12	12	12	5		88
Ironworkers		8	12	16	16	16	16	16	12	8	4		124
Laborers	8	12	12	12	14	14	16	16	16	12	6	2	140
Millwrights		8	10	12	22	24	24	24	24	14	4		166
Operating Engineers	6	7	8	9	8	8	8	8	8	6	2		78
Painters					2	2	3	3	6	6	2	1	25
Pipefitters		8	24	35	40	40	40	40	32	28	5		292
Sheetmetal Workers				3	3	3	4	4	4	1			22
Surveyors	2	2	2	2	2								10
Teamsters	4	4	4	4	4	4	4	4	4	2	1		39
Total Manual Staff	20	69	118	177	206	209	213	213	195	131	45	4	1,600
Total Contractor Staff*	3	12	20	30	35	36	36	36	33	22	8	1	272
Subtotal Plant Labor Force	**23**	**81**	**138**	**207**	**241**	**245**	**249**	**249**	**228**	**153**	**53**	**5**	**1,872**
Underground Transmission Line													
Equipment operators				2	2	2							**6**
Electricians				0	0	3							**3**
Carpenters				2	2	2							**6**
Laborers				3	3	3							**9**

TABLE 8.8-10
Construction Personnel by Month

	Months After Notice to Proceed												
Discipline	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**Total**
Foreman				1	1	1							3
T-line Labor Force Subtotal				**8**	**8**	**11**							**27**
Process Water Line													
Equipment Operators					3	3	3	3					12
Pipefitters					2	2	2	2					8
Laborers					2	2	2	2					8
Foremen					1	1	1	1					4
Water Line Labor Force					8	8	8	8					32
TOTAL LABOR FORCE	**23**	**81**	**138**	**215**	**257**	**26**	**257**	**257**	**228**	**153**	**53**	**5**	**1,931**

*These are supervisors and laborers that work for the general contractor
Other linears (i.e., gas line and potable water line) are part of plant construction workforce.

TABLE 8.8-11
Labor Union Contacts

Labor Union	Contact	Phone Number
San Francisco Building and Construction Trades Council (BTC)	Stan Warren, Secretary/Treasurer	(415) 467-3330
International Brotherhood of Electrical Workers (IBEW) Local 6	Matt Bamberger, Business Representative	(415) 861-5752
United Association (UA) – Plumbers & Fitters Local 38	Larry Lee, Business Agent	(415) 626-2000

TABLE 8.8-12
Available Labor by Skill in San Francisco County, 2001 to 2008

Occupational Title	Annual Averages		Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
	2001	2008			
Carpenters	3,450	3,900	450	13.0	1.8
Cement Masons & Concrete Finishers	350	380	30	8.6	1.2
Painters, Construction & Maintenance	1,380	1,560	180	13.0	1.8
Sheet Metal Workers	400	500	100	25.0	3.2
Electricians	2,130	2,490	360	16.9	2.3
Welders, Cutters, Solderers, & Brazers	570	630	60	10.5	1.4
Industrial Truck & Tractor Operators	710	740	30	4.2	0.6
Operating Engineers	480	520	40	8.3	1.2
Helpers, Laborers	2,990	3,450	460	15.4	2.1
Plumbers, Pipefitters, & Steamfitters	770	840	70	9.1	1.3
Administrative Services Managers	7,870	7,710	-160	-2.0	-0.3
Mechanical Engineers	290	310	20	6.9	1.0
Electrical Engineers	390	400	10	2.6	0.4
Engineering Technicians	930	950	20	2.2	0.3
Plant & System Operators	650	690	40	6.2	0.9

Source: CEDD, 2005c.

TABLE 8.8-13
Available Labor by Skill in the San Francisco PMSA, 2001 to 2008

Occupational Title	Annual Averages 2001	Annual Averages 2008	Absolute Change	Percentage Change	Average Annual Compounded Growth Rate (%)
Carpenters	8,570	9,020	450	5.3	0.7
Cement Masons & Concrete Finishers	1,170	1,130	-40	-3.4	-0.5
Painters, Construction & Maintenance	2,900	3,120	220	7.6	1.1
Sheet Metal Workers	1,230	1,390	160	13.0	1.8
Electricians	3,890	4,360	470	12.1	1.6
Welders, Cutters, Solderers, & Brazers	1,270	1,420	150	11.8	1.6
Industrial Truck & Tractor Operators	1,690	1,720	30	1.8	0.3
Operating Engineers	1,050	1,080	30	2.9	0.4
Helpers, Laborers	7,770	8,190	420	5.4	0.8
Plumbers, Pipefitters, & Steamfitters	2,040	2,090	50	2.5	0.3
Administrative Services Managers	13,100	13,050	-50	-0.4	-0.1
Mechanical Engineers	810	900	90	11.1	1.5
Electrical Engineers	1,220	1,300	80	6.6	0.9
Engineering Technicians	2,530	2,730	200	7.9	1.1
Plant and System Operators	1,000	1,080	80	8.0	1.1

Source: CEDD, 2005b.

8.8.4.3.4 Impacts to the Local Economy and Employment. The estimated value of materials and supplies that will be purchased locally during construction is $2 to $3 million. The City will provide about $13.41 million[1] in construction payroll over the 12-month construction period. The anticipated payroll for employees, as well as the purchase of materials and supplies during the construction period, will have a slight beneficial impact on the area. Assuming, conservatively, that 60 percent of the construction workforce will reside in San Francisco, it is expected that approximately $8.05 million[2] will stay in the local area during the 12-month construction period. These additional funds will cause a temporary beneficial impact by creating the potential for other employment opportunities for local workers in other service areas, such as transportation and retail.

Indirect and Induced Economic Impacts from Construction. Construction activity would result in secondary economic impacts (indirect and induced impacts) within San Francisco. Indirect and induced employment effects include the purchase of goods and services by firms involved with construction and construction workers spending their income within

[1] The initial $12.5 million in construction payroll was adjusted to reflect a 4 percent increase in payroll (thus the new construction payroll is estimated at $13.41million). The resulting payroll was further adjusted to include the addition of the HV Underground Transmission Line Labor Force (27) and water line labor force (32).

[2] The $8.05 million represents the annual portion of the local payroll for construction (i.e., $13.41 million in construction payroll multiplied by 60 percent [or the portion assumed to be local]).

San Francisco. In addition to these secondary employment impacts, there are indirect and induced income effects arising from construction. Indirect and induced impacts were estimated using an IMPLAN Input-Output model of San Francisco. IMPLAN is an economic modeling software program. The estimated indirect and induced employment within San Francisco would be 13 and 45 jobs, respectively. These additional jobs result from the $3 million in annual local construction expenditures as well as the $5.63 million in spending by local construction workers. The $5.63 million represents the disposable portion of the annual construction payroll (assumed to be 70 percent of the $8.05 million in annual construction payroll spent locally). Assuming an average monthly direct construction employment of 161 person years (1,931 person-months for construction/12 months), the employment multiplier associated with the construction phase of the project is approximately 1.4 (i.e., [161 construction jobs + 13 indirect jobs + 45 induced jobs]/161). This project construction phase employment multiplier is based on a Type Social Accounting Matrix (SAM) model.

Assuming that annual local construction expenditures are $2 million instead of $3 million results in indirect and induced employment estimates within San Francisco of 8 and 45 jobs, respectively. Based on the same average construction employment of 161, the construction phase employment multiplier would be approximately 1.3.

Indirect and induced income impacts were estimated at $520,700 and $1,987,700, respectively. Assuming a total annual local construction expenditure (payroll, materials, and supplies) of $11.05 million ($8.05 million in payroll + $3 million in materials and supplies), the project construction phase income multiplier based on a Type SAM model is approximately 1.2 (i.e., [$11,045,800 construction expenditures + $520,700 indirect income + $1,987,700 induced income]/$11,045,800]).

Indirect and induced income impacts based on the total annual construction expenditure of $10.05 million ($8.05 million in payroll + $2 million in materials and supplies) were estimated at $347,100 and $1,958,800, respectively. Based on these estimates, the construction phase income multiplier was estimated at 1.2.

8.8.4.3.5 Fiscal Impacts. SFERP initial capital cost is estimated to be $140 million. The estimated value of materials and supplies that will be purchased locally (within San Francisco) during construction is between $2 and $3 million. The effect on fiscal resources during construction will be from sales taxes realized on equipment and materials purchased in San Francisco and from sales taxes from expenditures. The sales tax rate in San Francisco is 8.5 percent (BOE 2005). Of this, 6 percent goes to the state; 0.25 percent goes to the County; 1 percent goes to the place of sale; and 1.25 percent goes to the special districts (BOE, 2005). The total local sales tax generated during construction is expected to be $170,000 to $255,000 (i.e., 8.5 percent of local sales). Of this amount, 1.25 percent of the sales taxes (about $25,000 to $37,500) would go to San Francisco, since it would receive the sales taxes for both the County and the point of sale.

8.8.4.3.6 Impacts on Education. Student enrollment in the San Francisco School District has been declining by an average of about 200 students a year since the 2001-02 school year (ED-Data, 2005; Fillingim-Selk, 2005). Enrollment figures for the current academic year (2004-05) indicate that this trend is reversing, though enrollment is not as high as it was in the 2000-01 school year.

Since there is a large local labor force, construction of SFERP will not cause significant population changes or housing impacts to the region. Most employees will commute to the site from within San Francisco (as well as from the nine-county Bay Area), as opposed to relocating to the area. As a result, SFERP construction will not cause any significant increase in demand for school services.

8.8.4.3.7 Impacts on Public Services and Facilities. The construction phases of the project may have minor impacts on police, fire, or hazardous materials handling resources. The San Francisco Fire Department does not anticipate any significant impacts during the construction phase of the project (Juarez, 2004). Copies of the records of conversation with the Police and Fire Departments are included in Appendix 8.8B. SFERP construction is not expected to create significant adverse impacts on medical resources in the area since there are a number of medical facilities in close proximity to the proposed project site. For more serious/major injuries, there are several emergency and urgent care facilities within a short distance of the project site.

8.8.4.3.8 Impacts on Utilities. SFERP construction will not make significant adverse demands on local water, sanitary sewer, electricity, or natural gas. While the project will require extension of existing utility lines, there is sufficient utility capacity for the project. Water requirements for construction are relatively insignificant. Given the modest number of workers and temporary duration of the construction period, the impacts on the local sanitary sewer system would not be significant.

8.8.4.4 Operational Impacts

8.8.4.4.1 Operational Workforce. The proposed SFERP facility is expected to begin commercial operation in the second quarter of 2007. It is expected to employ up to 11 full-time staff. Anticipated job classifications are shown in Table 8.8-14. The entire permanent workforce is expected to commute from within San Francisco or from the nine-county Bay Area.

Facility employees will be drawn from the local workforce and from existing staff. Consequently, only a slight increase in population is anticipated as a result of this project. There will be no significant impacts on local employment.

TABLE 8.8-14
Typical Plant Operation Workforce

Department	Personnel	Shift	Workdays
Operations	5 Operating Technicians 1 Instrument and Controls Technician	Rotating 12-hour shift, 2 operators per shift, 2 relief operators	7 days a week
Maintenance	2 Maintenance Technicians	Standard 8-hour days	5 days a week (Maintenance technicians will also work unscheduled days and hours as required [weekends])
Administration	3 Administrators (1 Plant Manager, 1 Assistant Plant Manager, 1 Administrative Assistant)	Standard 8-hour days	5 days a week, with additional coverage as required

8.8.4.4.2 Population Impacts. It is expected that the operational workforce will be drawn either from the local population or from the nine-county Bay Area. Even if this were not the case, due to the modest number of operations staff, significant impacts on population are not anticipated.

8.8.4.4.3 Housing Impacts. Due to the few operations staff, significant impacts to housing are not anticipated. Based on the housing vacancy data in Table 8.8-4, there are approximately 17,016 available housing units within San Francisco. Thus, if there are employees who need to relocate, they could choose to live in San Francisco. Nonetheless, any new demand for housing created by the operational workforce would not be significant.

8.8.4.4.4 Impacts on the Local Economy and Employment. SFERP operation will generate a small, permanent beneficial impact by creating employment opportunities for local workers through local expenditures for materials, such as office supplies and services. The average salary (including benefits) per operations employee is expected to be between $76,000 per year and $95,000[3] per year (this is based on the estimated operational payroll of $0.83 to $1.04 million per year and 11 full-time employees). Approximately $200,000 to $300,000 will be spent locally (i.e., within San Francisco) on materials and services each year. These additional jobs and spending will generate other employment opportunities and spending in the San Francisco area. The addition of 11 full-time jobs would not significantly reduce unemployment rates.

Indirect and Induced Economic Impacts from Operation. The operation of the proposed project would result in indirect and induced economic impacts that would occur within San Francisco, depending on the point of sale. These indirect and induced impacts represent permanent increases in San Francisco's economic variables. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance (O&M).

Estimated indirect and induced employment within San Francisco would be 1 and 3 permanent jobs, respectively. These additional 4 jobs result from the $1.17 million ($0.936[4] million in payroll and $0.25[5] million in local purchase of materials and services) in annual operational budget expected to be spent locally within San Francisco. The operational phase employment multiplier is estimated at 1.4 (i.e., [11 + 1 + 3]/11) and is based on a Type SAM multiplier.

Indirect and induced income impacts are estimated at $68,218 and $1,110,100, respectively. The income multiplier associated with the operational phase of the project is approximately 2.0 (i.e., [$1,186,000 + $68,218 + $1,110,100]/$1,186,000) and is based on a Type SAM model.

8.8.4.4.5 Fiscal Impacts. During operation, approximately $200,000 to $300,000 will be spent locally (i.e., within San Francisco) on materials and services each year. As stated earlier, SFERP will bring between $0.83 million and $1.04 million in operational payroll to the region.

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[3] Operational payroll was adjusted by increasing it by 4 percent.

[4] The $0.936 million is the midpoint of the estimated annual operations payroll of $0.832 million and $1.04 million.

[5] The $0.25 million is the midpoint of the estimated annual expenditures on materials/services purchased locally during operation.

Since the City is a public agency, it does not pay property taxes. Thus, CCSF would not derive any additional funds from property taxes. However, it would receive sales tax revenue from project expenditures.

During operations, additional sales tax revenues will be obtained by CCSF. Increased payroll will be $0.83 million to 1.04 million annually. Assuming local expenditures of $200,000 to $300,000 annually, the estimated sales taxes will be approximately $17,000 to $25,500. Of this amount, CCSF will receive $2,500 to $3,750 in sales tax revenues (1.25 percent of $200,000 to $300,000). The anticipated increase in sales tax revenues would be beneficial but not significant, since it would constitute such a small percent of total CCSF revenues.

8.8.4.4.6 Impacts on Education. Assuming that most of the 11 operational employees end up residing within San Francisco, SFERP operation is not expected to create any significant adverse impacts to the local school system (Fillingim-Selk, 2005). Assuming an average family size of 3.03 persons/household for San Francisco (U.S. 2000 Census) would imply the addition of between 11 and 22 children to the local schools. This would constitute less than one tenth of one percent increase in school enrollment. Due to its public agency status, the applicant is exempt from paying school impact fees to San Francisco Unified School District (Fillingim-Selk, 2005).

8.8.4.4.7 Impacts on Public Services and Facilities. Project operation will not make significant demands on public services or facilities even if all of the 11 operational employees decide to reside in San Francisco. The SFPD did not express any concerns about increased service demands during plant operations (Puccinelli, 2004). Copies of the records of conversation with the Police and Fire Departments are included in Appendix 8.8B. SFERP's operation would not create significant adverse impacts on medical resources in the area due to the safety record of power plants and few operations staff.

8.8.4.4.8 Impacts on Utilities. Potable water for drinking, safety showers, fire protection water, service water, and sanitary uses will be provided by the City. Water for process and cooling water, equipment wash water and the dual plumbing system (toilets) would be recycled water to be produced on the site at a new recycled water treatment system included as part of the project design. The plant's operation will not otherwise make significant adverse demands on local water, sanitary sewer, electricity, or natural gas because adequate supply and capacity currently exist.

8.8.5 Cumulative Impacts

Present and foreseeable projects in the project vicinity that have either been approved or are pending approval by the City include the MUNI Metro East Operation and Maintenance facility adjacent to and west of the project site (with construction expected to occur from Summer 2005 to Spring 2008); 494 additional housing units; and several hundred thousand square feet of commercial development. The Port of San Francisco is planning a large mixed-use development at Pier 70. In addition, the Port has several other projects planned or under construction: (1) a multi-modal bridge over Islais Creek that will link Illinois Street to Cargo Way and will provide access for rail, truck traffic, and bicyclists, with construction to start in March 2005, lasting 18 months; (2) two concrete/cement batch plants south of Islais Creek on Piers 92 and 94, with both plants expected to be operational by summer 2005; and (3) Pier 90-94 Backlands 44-acre site is in the initial planning phase for a distribution

and warehouse complex. No other commercial electrical generation projects are planned or proposed within the project vicinity (with the exception of Potrero Unit 7 that is in suspension). In addition, the City is currently constructing a light rail extension down Third Street, which would be complete before SFERP would be licensed. Each of these projects would require construction labor.

Specific construction periods are only available for the MUNI and some of the Port projects. These projects will be constructed concurrently with the SFERP. However, since the Bay Area workforce is so large, a shortage of labor resources is not anticipated. Also, due to the size of the local workforce, relocation of workers with their families is not anticipated. Since both construction and operations personnel for these projects will be drawn primarily from San Francisco or the surrounding nine-county Bay Area, no adverse impacts to local schools or housing is anticipated. No adverse cumulative socioeconomic impacts are anticipated from the construction of SFERP and these other facilities. Instead, San Francisco will receive a beneficial (but not significant) impact from short-term construction spending and longer-term operations.

Subsection 8.4, Land Use, describes planned residential units in the project vicinity. No specific time tables for development of these projects are available. Therefore, cumulative construction impacts to schools, housing and public services cannot be analyzed with respect to the project. However, as stated above, since the local construction workforce is so large, it is unlikely that development of these projects, even if they occurred simultaneously with the SFERP project, would create a significant cumulative impact.

8.8.6 Environmental Justice

Environmental justice is addressed in Section 4.0, Environmental Justice.

8.8.7 Mitigation Measures

Since there are no significant adverse impacts caused by the project, no socioeconomic-specific mitigation measures are proposed.

8.8.8 Involved Agencies and Agency Contacts

Table 8.8-15 provides a list of agencies and contact persons of potentially responsible agencies. Copies of records of conversation are provided in Appendix 8.8B.

TABLE 8.8-15
Agencies and Agency Contacts for SFERP Socioeconomics

Agency	Contact/Title	Phone Number	Address
San Francisco Unified School District	Jeff Fillingim-Selk, Head of Operations	(415) 241-6000	555 Franklin St., Rm 102 San Francisco, CA 94102
San Francisco Fire Department	Lt. Barry Wong, Station #37 Fire Fighter Leo Tingin, Station #25 Lt. Chris Reyes, Station #9	(415) 558-3237 (415) 558-3225 (415) 558-3209	698 Second Street San Francisco, CA 94107
San Francisco Police Department	Captain Rick Bruce	(415) 671-2300	201 Williams Street San Francisco, CA

8.8.9 Permits and Permitting Schedule

Permits dealing with the effects on public services are addressed as part of the building permit process. For example, school development fees are typically collected when the applicant pays in-lieu building permit fees. However, since the applicant is a public agency, it does not pay school impact fees. No permits are required to comply with the socioeconomic impacts of the project.

8.8.10 References

Bamberger, M. 2004. Personal communication between Fatuma Yusuf of CH2M HILL and Matt Bamberger, Business Representative, International Brotherhood of Electrical Workers (IBEW) Local 6. January 5.

Bankrate.com, 2005. Internet site: http://www.bankrate.com/brm/news/real-estate/home-values2.asp#CA. Viewed February 17.

Bruce, R. 2005. Personal communication between Fatuma Yusuf of CH2M HILL and Rick Bruce, Captain, San Francisco Police Department. February 9.

California Board of Equalization (BOE). 2005. California City and County Sales and Use Tax Rates *Publication 71*.

California Department of Finance (DOF). 2005a. Demographic Information. Reports and Research Papers. Revised Historical County Population Estimates and Interim County Population Projections. Internet sites:
http://www.dof.ca.gov/HTML/DEMOGRAP/E-4text2.htm
http://www.dof.ca.gov/HTML/DEMOGRAP/E-6text.htm
http://www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm
http://www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm#projections

California Department of Finance (DOF). 2005b. Demographic Information. Reports and Research Papers. City/County Population and Housing Estimates, 2004, Revised 2001-2003, with 2000 DRU Benchmark. Internet sites:
http://www.dof.ca.gov/HTML/DEMOGRAP/E-5text2.htm

California Department of Finance (DOF). 2005c. Financial and Economic data. California Statistical Abstract, released December 2004 – Construction, *Table I-5Residential Construction Authorized by Permits, Units and Valuation, California and Counties*. Internet site:
http://www.dof.ca.gov\html\fs-data\profiles\pf-home.htm

California Department of Finance (DOF). 2005d. Financial and Economic data. California County Profiles – *San Francisco*. Internet site:
http://www.dof.ca.gov\html\fs-data\profiles\pf-home.htm.

California Employment Development Department (CEDD). 2005a. Employment by Industry Data. Internet site: http://www.calmis.cahwnet.gov/htmlfile/subject/indtable.htm

California Employment Development Department (CEDD). 2005b. Occupational Employment Projections. Internet site:
http://www.calmis.ca.gov/htmlfile/msa/modesto.htm

http://www.calmis.ca.gov/htmlfile/county/sanfran.htm
http://www.calmis.ca.gov/htmlfile/county/marin.htm.

City and County of San Francisco. 2003. Mayor's Proposed Budget 2003-2004.

City and County of San Francisco (CCSF). 2004. General Plan. Commerce and Industry Element. Accessed January. Internet site: http://sfgov.org/planning/egp/comin.htm

City and County of San Francisco. 2005. Summary Consolidated Budget and Annual Appropriation Ordinance, FY Ending June 2003, FY Ending June 2004 and FY Ending June 2005.

Education Data Partnership [ED-Data]. 2005. Fiscal, Demographic, and Performance Data on California's K-12 Schools. Reports. Internet site: http://www.ed-data.k12.ca.us

Fillingim-Selk, J. 2005. Email communication between Fatuma Yusuf of CH2M HILL and Jeff Fillingim-Selk, Operations Manager, Enrollment Placement Center (EPC), San Francisco Unified School District. February 4.

Juarez, F. 2004. Personal communication between Fatuma Yusuf of CH2M HILL and Fernando Juarez, Lieutenant, San Francisco Fire Department. January 5.

Lee, L. 2004. Personal communication between Fatuma Yusuf of CH2M HILL and Larry Lee, Business Agent, United Association (UA) – Plumbers & Fitters Local 38. January 6.

Lewis, B. 2005. Personal and email communication between Fatuma Yusuf of CH2M HILL and Brent Lewis, Senior Administrative Analyst, Budget and Analysis Division, Controller's Office. March 1.

Puccinelli, M. 2004. Personal communication between Fatuma Yusuf of CH2M HILL and Mike Puccinelli, Captain, San Francisco Police Department. January 6.

Reyes, C. 2005. Personal communication between Fatuma Yusuf of CH2M HILL and Chris Reyes, Lieutenant, San Francisco Fire Department Station No. 9. February 1.

San Francisco Center for Economic Development (SFCED). 2003. San Francisco Quarterly Economic Briefing, *1st Quarter Outlook 2003.* Internet site: http://www.sfced.org

San Francisco Fire Department (SFFD). 2004. Fire Facts. Internet site: http://www.sfgov.org/site/fire_index.asp

Strong, J. 2005. Email communication between Fatuma Yusuf of CH2M HILL and Justin Strong, Smith Travel Research (Statistics). February 2.

Tingin, L. 2005. Personal communication between Fatuma Yusuf of CH2M HILL and Leo Tingin, Fire Fighter, San Francisco Fire Department Station No. 25. February 1.

Warren, S. 2004. Personal communication between Fatuma Yusuf of CH2M HILL and Stan Warren, Secretary/Treasurer, San Francisco Building Trades Council. January 5.

Wong, B. 2005. Personal communication between Fatuma Yusuf of CH2M HILL and Barry Wong, Lieutenant, San Francisco Fire Department Station No. 37. February 1.

SUBSECTION 8.9

Agriculture and Soils

8.9 Agriculture and Soils

8.9.1 Introduction

This subsection describes the potential environmental effects on agriculture and soils from the construction and operation of the project. Potential impacts are assessed for the proposed San Francisco Electric Reliability Project (SFERP) site and the associated underground pipelines for supplying natural gas, potable water, and process (recycled) water to the site. It also assesses impacts for the underground electric transmission line connection that extends to the west and north of the site.

Subsection 8.9.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to agriculture and soils. Subsection 8.9.3 describes the existing environment that could be affected, including agricultural use and soil types. Subsection 8.9.4 identifies potential environmental effects, if any, from project development, and Subsection 8.9.5 presents mitigation measures. Subsection 8.9.6 describes the required permits and provides agency contacts. Subsection 8.9.7 provides the references used to develop this subsection.

A map of soil types is provided in Figure 8.9-1 (figures are located at the end of this subsection). LORS are summarized in Table 8.9-1. The characteristics of the relevant soil types are summarized in Table 8.9-2. Soil loss is discussed in Subsection 8.9.3.4 and is summarized in Tables 8.9-3, 8.9-4, and 8.9-5. The effect of plant emissions on soils is presented in Subsection 8.9.4.4. Required permits are summarized in Table 8.9-6.

8.9.2 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, county, and local LORS applicable to agriculture and soils are discussed below and summarized in Table 8.9-1.

8.9.2.1 Federal LORS

8.9.2.1.1 Federal Water Pollution Control Act of 1972 and the Clean Water Act of 1977. The Federal Water Pollution Control Act of 1972, commonly referred to as the Clean Water Act (CWA) following an amendment in 1977, establishes requirements for discharges of stormwater or wastewater from any point source that would affect the beneficial uses of waters of the United States. The Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with a National Pollution Discharge Elimination System (NPDES) permit. The State Water Resources Control Board (SWRCB) is the permitting authority in California and has adopted a statewide general permit for stormwater discharges associated with construction activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. The proposed project would result in disturbance of more than one acre of soil. Therefore, the project will require the preparation of a stormwater management plan. The requirements are described in greater detail in Subsection 8.14, Water Resources. The City will develop and implement an erosion and sediment control plan to reduce the impact of runoff from the construction site. The erosion and sediment control plan will be reviewed and approved by City departments and the Port of San Francisco (Port) prior to implementation, and periodic inspections will be conducted to ensure compliance with the approved erosion and sediment control plan (Lee, 2004).

The CWA's primary effect on agriculture and soils within the project area consist of control of soil erosion and sedimentation during construction, including the preparation and execution of erosion and sedimentation control plans and measures for any soil disturbance during construction.

8.9.2.1.2 U.S. Department of Agriculture Engineering Standards. The U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), *National Engineering Handbook*, 1983, Sections 2 and 3, provide standards for soil conservation during planning, design, and construction activities. The project would need to conform to these standards during grading and construction to limit soil erosion.

8.9.2.2 State LORS

8.9.2.2.1 California Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act of 1972 is the state equivalent of the federal CWA, and its effect on the SFERP would be similar. The California Water Code requires protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The discharge of soil into surface waters resulting from land disturbance may require filing a report of waste discharge (see Water Code Section 13260a). The Regional Water Quality Control Board (RWQCB), which controls surface water discharges, may become involved indirectly if soil erosion threatens water quality.

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards for Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Subsection Explaining Conformance)
Federal	Federal Water Pollution Control Act of 1972: Clean Water Act of 1977 (including 1987 amendments)	Regulates stormwater discharge from construction and industrial activities	RWQCB San Francisco Bay Region, under State Water Resources Control Board. USEPA may retain jurisdiction at its discretion.	Subsections 8.9.2.1 and 8.9.4.2
	Natural Resources Conservation Service (1983), *National Engineering Handbook*, Sections 2 and 3	Standards for soil conservation	Natural Resources Conservation Commission	Subsections 8.9.2.1 and 8.9.5
State	Porter-Cologne Water Quality Control Act of 1972; Cal. Water Code 13260-13269: 23 CCR Chapter 9	Regulates stormwater discharge	California Energy Commission (CEC) and the San Francisco Region, under State Water Resources Control Board	Subsections 8.9.2.2 and 8.9.4.2
Local	Public Health Code	Hazardous waste	City and County of San Francisco	Subsections 8.9.2.3 and 8.9.4.2

TABLE 8.9-1
Laws, Ordinances, Regulations, and Standards for Agricultural and Soil Resources

Jurisdiction	LORS	Purpose	Regulating Agency	Applicability (AFC Subsection Explaining Conformance)
	San Francisco Health Code Article 22A	Requires site history, and if necessary, soil sampling and analysis to identify hazardous wastes	San Francisco Department of Public Health; Director of the Department of Public Health	Subsections 8.9.2.3 and 8.9.4.2
	Building Code	Excavation and grading	City and County of San Francisco	Subsection 8.9.2.3
	Port of San Francisco Stormwater Management Plan (December 2003)	Regulates construction stormwater management	San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)	Subsection 8.9.4.2

8.9.2.3 Local LORS

The San Francisco Public Health Code (Article 22A) governs development of properties located in the filled land adjacent to San Francisco Bay with respect to hazardous waste materials that could be encountered during construction. Formerly known as the Maher Ordinance, it provides the requirements for testing and reporting for proposed developments in its area of jurisdiction.

In addition, the San Francisco Building Code (SFBC) amends the Uniform Building Code (UBC) and California Building Code (CBC) including Chapter 70, which establishes excavation, grading, and erosion control standards. It requires about 2 weeks for the Department of Building Inspection to assign an inspector to specific projects for review and approval of grading, excavation, and erosion control plans (Tham, 2003). During construction, stormwater will either percolate to the ground or flow directly to the San Francisco Bay under the Port's Stormwater Management Plan (SWMP) and NPDES permit. The Port's SWMP requires development and implementation of a construction SWMP for all construction sites greater than one acre.

8.9.3 Environmental Setting

The proposed 4.0-acre SFERP site is located in southeast San Francisco within an urban area along the western shore of the San Francisco Bay (the Bay). The site is bounded on the west by the proposed MUNI Metro East Light Rail Vehicle Maintenance and Operation Facility along Illinois Street, on the north by 25th Street, on the east by Maryland Street, and on the south by a developed property along the north side of Cesar Chavez Street. Surrounding land uses are composed of mixed light and heavy industrial and commercial properties. Businesses in the surrounding area include shipping and dry dock facilities, warehouses, manufacturing, and various small commercial businesses. The SFERP is currently being used as the location of a portable concrete batch processing plant. Prior uses of the

properties in this area were likely associated with the switchyard for the former Western Pacific Railroad or shipping and receiving (AGS, 1999). The approximately 8.5-acre construction material laydown site is located directly across Maryland Street from the proposed SFERP site. Both the SFERP site and laydown area were likely part of the former railroad switchyard and are currently vacant at this time, except for some temporary storage of shipping containers on the laydown area property. Both properties are nearly level and are unpaved and/or partially covered with gravel. Surrounding and nearby properties have been (or are currently) used for barrel manufacture, fuel storage tank facilities, steel and iron fabrication, manufactured gas plant facilities, railroad facilities, and a sugar refinery (Geomatrix Consultants, Inc., 2000).

There are no agricultural land uses within the proposed SFERP site or vicinity. The gas, water supply, and electrical connections will be made to existing facilities nearest to the SFERP site and all underground trenches will be completed within existing roadways and rights-of-way.

Soil survey mapping units characterizing the types and distribution of soils within the project area, as shown on Figure 8.9-1, are taken from *Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California* (NRCS, 1991). The electronic shape files for these mapping units were downloaded from the NRCS website. Detailed soil descriptions were developed from the soil survey publication (NRCS, 1991).

Data for the affected environment are summarized and presented in the following paragraphs.

Soil types for the project site and along the project water supply pipeline are identified in Figure 8.9-1. Table 8.9-2 summarizes the characteristics of each of the individual soil mapping units identified on Figure 8.9-1 in the areas that will be potentially affected by project construction, including the site boundaries and the project's linear facilities. The table summarizes depth, texture, drainage, permeability, erosion hazard rating, land capability classification, and fertility as an indicator of its revegetation potential.

There are no soil series designated as "Prime Farmland" (or Farmland of Statewide Importance) among the soils listed in Table 8.9-2.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
134	Urban Land—Orthents, Reclaimed Complex—Slope Class (0 to 2 percent) This map unit includes areas that were once part of San Francisco Bay and adjacent tidal flats. It is about 65 percent urban land and 30 percent Orthents, reclaimed. Orthents consist of soils that have been filled and vary greatly in texture, including soil, gravel, concrete and asphalt rubble, solid wastes, and Bay Mud. They are very deep and can be poorly to somewhat poorly drained. The highly variable soil characteristics are related to the differences and amount of fill material used. Some areas have a permanent high water table at a depth of 30 to 60 inches because of fluctuating tides. Runoff is slow and the hazard of water erosion is low. The map unit is in capability class VIII and, as mentioned above, this soil capability class has limitations that essentially preclude its use for commercial crop production. The main limitations of these soils are a high water table, potential for subsidence and low fertility. These soil mapping units have highly variable soil properties related to the type and quality of fill used.

TABLE 8.9-2
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
131	Urban Land—Slope Class (0 to 5 percent typical, but may range from 0 to 30 percent) This map unit features areas where more than 85 percent of the surface is covered by paving, buildings, and other structures, typically at slopes of 0 to 5 percent. This map unit is classified as soil capability class VIII. This soil capability class corresponds to the lowest ranking suitability for field crops because soil limitations essentially preclude its use for commercial crop production. The soils at the SFERP and surrounding areas are not used for crop production. Urban soils are typically regraded, native soils with some amounts of fill. Given that the native soils likely derived from the underlying surficial geologic formations, which are mapped as serpentinized, ultramafic rock (Wagner et al., 1991), there is a potential for some of these soils to contain natural forms of asbestos.
132	Urban Land—Orthents, Cut and Fill Complex—Slope Class (0 to 5 percent)*
133	Urban Land—Orthents, Cut and Fill Complex—Slope Class (5 to 75 percent)*

Notes:

Soil characteristics are based on soil mapping provided in the published soil survey (NRCS, 1991) and are limited to those mapped in the vicinity of the SFERP project.

* These soil units comprise the majority of the area moving westward (inland) from the SFERP area and consist primarily of urban land and Orthents (i.e., young soils) complexes, as listed below. The soils are similar to the soil mapping unit 131 in that regraded soils often derive from the in-place, native soils, which are not mapped. Because these soils are outside of the proposed SFERP area and not associated with important farmlands or wetland areas, they are not described in detail.

8.9.3.1 Agricultural Use on and around the Proposed SFERP Site

The types of land use surrounding the proposed SFERP site are presented and discussed in Subsection 8.4, Land Use. A review of the aerial photograph base map, provided in the soil survey (NRCS, 1991), confirmed that the site and surrounding areas are not used to support livestock or agricultural production. The soils mapped at the SFERP and surrounding areas are indicated to be of the soil capability subclass VIII, essentially unsuitable to commercial crop production. None of the mapped soil units in the project area are associated with prime agricultural land and agricultural activities were not observed during field visits to the site and surrounding area.

The Farmland Mapping and Monitoring Program (FMMP) of the California Department of Conservation (CDC) does not provide any statistics on conversion of farmland to non-agricultural uses for San Francisco County where the SFERP site is located (CDC, 2003). A review of the "Important Farmlands" mapping by the FMMP shows the project site and surrounding areas to be designated as "Urban and Built-Up Land."

8.9.3.2 Agricultural Use along the SFERP Linear Features

The proposed SFERP project will have underground utility connections for supplying natural gas, potable water, and process (recycled) water to the SFERP site. Similarly, the electric transmission line will be connected through an underground conveyance. The natural gas supply pipeline will extend from the northwest corner of the SFERP site approximately 900 feet to the west along 25th Street. The potable water line will extend southward approximately 300 feet from the southeast corner of the SFERP site to an existing line within Cesar Chavez Street. The process water supply for the SFERP project will be

pumped from an existing water pumping station (see Figure 8.9-1) through a conveyance pipeline approximately 0.76 mile long that will bring the wastewater to the SFERP site where it will be treated for use in an onsite treatment plant. The process water pipeline will be constructed from near the southeast corner of the SFERP site and will follow Cesar Chavez Street westward to a point where it joins into an existing collection box that will carry the process water pipeline under Highway 280 and south to within 101 feet of the pumping station. No soil trenching will be required along the existing collection box segment that is approximately 1,335 feet in length.

The underground electric transmission line will run from the northwest corner of the SFERP site west along 25th Street, then north along Michigan Street to 24th Street where it turns west to Illinois Street. The line then runs north along Illinois Street. The line will enter the Potrero switchyard either from Illinois Street or from 22nd street. Given the location of the proposed trenching areas described above, the SFERP linear features will have no impact on agricultural land uses.

8.9.3.3 Soil Types within the Study Area and Prime Farmlands

Table 8.9-2 provides a description of the properties of the soil mapping units that are found in the vicinity of the proposed SFERP site and along the proposed linear facility routes. As indicated, the soil mapping units in the project area are associated with urban land and Orthents (i.e., young soils) with wide-ranging slope classes and low capability to support commercial crop production (soil capability class VIII).

In Figure 8.9-1, the entire project site and laydown area, as well as the majority of the linear features, lie within soil mapping unit [134] Urban land – Orthents. A relatively small portion of the process water line and the electric transmission line may occur within soil mapping unit [131] (Urban land) at their most distant ends. The available information in the soil survey, specific to erosional properties of the soil mapping units that could be potentially affected, was included in Table 8.9-2. For soil mapping unit [134], the survey provided information on depth, drainage, and erosion hazard as provided in the table. However, this same information was not provided for soil mapping unit [131].

The proposed SFERP project will not affect any Prime Farmlands or other important farmlands. In fact, the project will not affect any lands used for agricultural production.

8.9.3.4 Soil Loss and Erosion

The factors that have the largest effect on soil loss include steep slopes, lack of vegetation, and erodible soils composed of large proportions of fine sands. The Soil Survey of San Mateo County, Eastern Part, and San Francisco County indicates that soils in the SFERP area have a low water erosion potential. Other indications that the water and wind erosion potential in this area is low include:

- There are nearly level conditions at the site, laydown area, and along the linears.
- The majority of soil is likely comprised of heterogeneous native and non-native fill.
- The site is surrounded by other developed properties and buildings that will limit locally significant ground-level winds that could lead to excessive wind erosion.

- The water table is close to the surface resulting in moist soils which will help minimize wind erosion.

Best management practices will be used to minimize erosion at the site during construction. These measures typically include mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. Water erosion will be mitigated through the use of sediment barriers and wind erosion potential will be reduced significantly by keeping soil moist or by covering soil piles with mulch or other wind protection barriers. These temporary measures would be removed from the site after the completion of construction and the site will paved or completely covered. The final state of the site during operations will be completely paved or otherwise covered so soil erosion loss at that point would be negligible.

8.9.3.4.1 Water Erosion. Despite the low potential for soil erosion in the SFERP project area, an estimate of erosion by water and wind is provided below. For the purpose of estimating accelerated soil due to water erosion during construction, the following assumptions were made:

- Estimates of soil loss (in tons) were made for sand and loamy sand only because these are potentially the most erosive soils that could be present at the site and because other site-specific soil information was lacking.
- No contouring or other surface management.
- Rainfall erosivity used was for San Francisco profile.
- Assumes 100-foot slope length with 2 percent average slope.
- Soil loss estimates, as seen in Table 8.9-3, are provided for conditions during construction (estimated in model as 'bare ground, smooth surface'); for conditions during grading (estimated in model as 'bare ground, rough surface'); and for conditions in undisturbed state or with implementation of construction best management practices [BMPs] (estimated in model as 'tall fescue, not harvested').

Soil loss calculations assumed the following parameters:

- Site is 4.0 acres and laydown area is 8.5 acres (estimated from GIS). Active soil grading would occur over a 2-month period at the project site and a 1-month period at the laydown area, and soil would be exposed on both sites for the entire 10-month construction period.
- The total area for 5-ft. wide linear trenches is 0.778 acres within existing roadways. This total area was divided into five equal segments that would be worked at any one time (or 0.156 acre). Active grading or exposed soils was estimated for these segments for a 1 month period before they would be re-paved.

TABLE 8.9-3
Estimated Soil Loss by Water Erosion Using RUSLE2 Model for the Project Construction Phase

			Estimated Soil Loss (tons)			
Soil Loss Conditions	**Soil Loss (tons/acre/year)**	**Months**	**Site (4.0 ac)**	**Laydown (8.5 ac)**	**Linears (0.156 ac)**	**Total**
During Construction	1.2 to 1.3	10	4.00 to 4.34	8.54 to 9.25	0.16 to 0.17	12.56 to 13.61
During Active Grading	2.9 to 3.3	2	1.93 to 2.20	2.06 to 2.35	0.038 to 0.043	4.04 to 4.59
Undisturbed State or with Implementation of Construction BMPs	0.0037 to 0.0043	Not applicable	0.015 to 0.017 tons/yr	0.032 to 0.037 tons/yr	0.0006 to 0.0007 tons/yr	0.047 to 0.055 tons/yr

RUSLE2 Model Assumptions:

The range in soil loss is due to range in soil conditions. The lower number is for sand and the higher number is for loamy sand, two soil types that are considered to be the most potentially erosive and could be present at the site based on a subsurface geotechnical assessment made on a nearby property. It is presumed that more fine-grained soils would be less erosive and that these estimates present a worse-case scenario.

The final state of the site during operations will be completely paved or otherwise covered so soil erosion loss at that point would be negligible.

Soil losses during construction are approximated by 'bare ground, smooth surface'; during grading by 'bare-ground, rough surface'; and in undisturbed state or with full BMPs by 'tall fescue, not harvested'.

It should be recognized that the estimate of accelerated soil loss by water is very conservative because of the 'worst-case' assumptions noted above. Furthermore, the full implementation of construction BMPs to reduce soil erosion will likely reduce soil losses to near negligible levels. This is especially important in light of the potential to encounter unknown subsurface contaminants in previous developed industrial areas during excavation.

In some cases, construction activities may actually accelerate degradation of some of the organic chemicals. Many hydrocarbons and PAHs that are likely present at the site, degrade more rapidly under aerobic (presence of oxygen) conditions. Construction activities will mix air (oxygen) into the surface soils which can be used by indigenous microorganisms to degrade the organic contaminants. Furthermore, plans to pave most of the site will stabilize these soils in place, thereby protecting these soils from wind and water erosion.

8.9.3.4.2 Wind Erosion. The potential for wind erosion of surface material at the SFERP was estimated by calculating the total suspended particulates that could be emitted from active grading activities and the wind erosion of exposed soil. The total site area and grading duration were multiplied by emission factors to estimate the total suspended particulate matter (TSP) emitted from the site. Fugitive dust from site grading was calculated using the default particulate matter less than 10 microns in equivalent diameter (PM_{10}) emission factor used in URBEMIS2002 and the ratio of fugitive TSP to PM_{10} published by the Bay Area Air Quality Management District (BAAQMD, 2005). Fugitive dust resulting from the wind erosion of exposed soil was calculated using the emission factor in AP-42 (Table 11.9-4 in BAAQMD, 2005).

Mitigation measures, such as watering exposed surfaces, are used to reduce PM_{10} emissions during construction activities. The BAAQMD has not published PM_{10} emission reduction

TABLE 8.9-4
Mitigation Measures for Fugitive Dust Emissions

Mitigation Measure	PM_{10} Emission Reduction Efficiency	Efficiency Applied
Water active sites at least twice daily	34-68%	50%
Enclose, cover, water twice daily, or apply non-toxic soil binders, according to manufacturer's specifications, to exposed piles (i.e., gravel, sand, dirt) with 5 percent or greater silt content	30-74%	50%

Source: SCAQMD CEQA Handbook, Table 11-4. (1993)

efficiencies for mitigation measures. Therefore, PM_{10} reduction efficiencies from the South Coast Air Quality Management District (SCAQMD) CEQA Handbook (1993) were used to estimate the effectiveness of the mitigation measures. Table 8.9-4 summarizes the mitigation measures and PM_{10} efficiencies applied to the emission calculations.

Table 8.9-5 summarizes the mitigated TSP predicted to be emitted from the site from grading and the wind erosion of exposed soil. Without mitigation, the maximum predicted erosion of material from the site with implementation of mitigation measures is estimated at 6.7 tons over the course of the plant and linear construction cycle. This estimate is reduced to around 2.6 tons by implementing basic mitigation measures.

TABLE 8.9-5
Total Suspended Particulate Emitted from Grading and Wind Erosion with and without Mitigation

Emission Source	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:			
Site Area (4.0 acres)	2	1.47	0.73
Laydown Area (8.5 acres)	1	1.57	0.78
Linear Trench Areas (0.156 acre for 1/5th segments)	1	0.03	0.014
Wind-Blown Dust:			
Site Area (4.0 acres)	9	1.14	0.34
Laydown Area (8.5 acres)	9	2.43	0.73
Linear Trench Areas (0.156 acre for 1/5th segments)	1	0.049	0.0015
Total		**6.69**	**2.60**

Notes:

Assumptions for grading are that duration will be 2 months for the project site and 1 month for the laydown area. All linears will be trenched so grading for these features was estimated by dividing linear length into 5 segments of equal length and assume grading duration of one month for each segment. Given that linears will occur along existing paved roadways, it is assumed the trench width will be 5 ft. and that completed segments will be paved after the 1 month period.

The assumptions for wind erosion on bare soil surfaces are that erosion would occur on half of the project site and laydown area for the duration of plant construction (estimated at 18 months). It was further assumed that exposed soil conditions for each of the 5 equal linear segments would last for 1 month duration.

8.9.3.5 Other Significant Soil Characteristics

A significant soil characteristic concerning the proposed project is the potential for shallow groundwater that could affect excavations, especially in the reclaimed soil areas that comprise the SFERP site and surrounding areas. These filled areas, constructed over the former Bay, may also have subsidence issues for construction.

The underlying surficial geologic formation is mapped as a serpentinized, ultramafic rock (Wagner et al., 1991), so any native soils could have some naturally occurring asbestos materials, and would require dust control and possibly require personal protective equipment during drilling or certain earth moving construction activities. Given the industrial history of the site and surrounding properties, there is a significant possibility of encountering contaminated soil materials during drilling and excavation (see Subsection 8.13, Waste Management, for a detailed discussion).

8.9.4 Potential Environmental Consequences

The following subsections describe the potential environmental effects on agricultural production and soils during the construction and operation phases of the project.

The potential for impacts to agricultural and soils resources were evaluated with respect to the criteria described in the Appendix G checklist of CEQA. An impact is considered potentially significant if it would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps for the Farmland Mapping and Monitoring Program by the California Resources Agency, to non-agricultural use
- Conflict with existing zoning for agricultural use or a Williamson Act contract
- Involve other changes in the existing environment which, because of their location or nature, could result in conversion of Farmland to non-agricultural use
- Impact jurisdictional wetlands
- Result in substantial soil erosion

The following subsections describe the anticipated environmental impacts on agricultural production and soils during plant construction and operation.

8.9.4.1 Impacts on Agricultural Soils or Wetland Soils

As previously indicated, the SFERP site and associated linears are located within an urban portion in the Potrero District of southeastern San Francisco. There are no current agricultural uses of the lands at the SFERP site or in the surrounding areas. The mapped soils in these areas are considered essentially unsuitable for commercial crop production. As such, the proposed SFERP will not have any impact on agricultural soils or important farmlands. For this reason, the SFERP will not affect any properties currently under a Williamson Act contract or conflict with existing zoning for agricultural use.

Based on an assessment of the soil survey information and knowledge of the site conditions, the proposed SFERP will not affect wetland soils. The soils mapped in the SFERP area are those associated with the soil mapping unit (134 Urban Land—Orthents, Reclaimed

Complex). These soils are indicated to have the potential for somewhat poorly drained conditions (indicating potential hydric soils). Even with the potential for hydric soils to occur, the lack of wetland vegetation and hydrology in the SFERP area would mean that. there are no wetlands on the site. Soil drainage would be expected to improve moving westward (inland) along the process water pipeline linear route along Cesar Chavez Street and along the northern portion of the electric transmission line on Illinois Street.

8.9.4.2 Construction

Construction impacts on soil resources can include increased soil erosion and soil compaction. Soil erosion causes the loss of topsoil and can increase the sediment load in surface receiving waters downstream of the construction site. The magnitude, extent, and duration of construction-related impacts depend on the erodibility of the soil (discussed in Subsection 8.9.3.4), the proximity of the construction activity to receiving water, and the construction methods, duration, and season.

Since the erosion characteristics of the soil type at the site are minimal, very little soil erosion is expected during the construction period. In addition, BMPs will be implemented during construction, as described in Subsection 8.9.5 of this Supplement. At a minimum, the City requires that the project sponsor develop and implement an erosion and sediment control plan to reduce the impact of runoff from the construction site (see Subsection 8.14.3.2.4). Therefore, impacts from soil erosion are expected to be less than significant. Consequently, as described in Subsection 8.9.4.5, cumulative impacts are also expected to be negligible. Monitoring will involve inspections to ensure that the BMPs described in the erosion and sediment control plan are properly implemented and effective.

Construction of the proposed project would result in soil compaction during the construction of foundations, pump stations, pipelines, and paved roadway and parking areas. Soil compaction would also result from vehicle traffic along temporary access roads and in equipment staging (laydown) areas. Soil compaction increases soil density by reducing soil pore space. This, in turn, reduces the ability of the soil to absorb precipitation and transmit gases for respiration of soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation. The incorporation of BMPs during project construction will result in less-than-significant impacts from soil compaction during construction.

Since the site and project linears will be constructed in previously filled and developed areas that will be repaved or otherwise protected after construction, the overall anticipated effects of construction are considered to be less than significant.

8.9.4.2.1 Contaminated Soil. As described in Subsection 8.13.3, the SFERP facility will be constructed within an area which has the potential to contain contaminated soil. Because the project, including the SFERP location and portions of the wastewater line, is located bayward of the historic high tide line and would involve the excavation of greater than 50 cubic yards of soil, Article 22A of the San Francisco Health Code would apply. The requirements would be triggered by the building permit application or equivalent process (the City and County of San Francisco is not subject to the Building Code requirements for building permits). Major requirements many of which may already have been fulfilled by previous investigations and documents, include:

- Preparation of a site history report to describe past site uses and identify whether the site is listed as a hazardous waste site pursuant to state or federal regulations.
- Implementation of a soil investigation to evaluate the potential presence of hazardous wastes in the soil.
- Preparation of a soil analysis report that evaluates the results of chemical analysis of the soil samples.
- Preparation of a site mitigation report, if contamination is identified, assessing potential environmental and health and safety risks, recommending measures to mitigate the risks, identifying appropriate waste disposal and handling requirements, and presenting criteria for on-site reuse of soil.
- Preparation of a certification report stating that either (1) no hazardous wastes present in the soil present an unacceptable risk and that no mitigation measures are required; or (2) all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified through follow-up soil sampling and analysis, if required.

A site history report will be prepared for both the project site, and for those portions of the wastewater line located bayward of the historic high tide line. A project-specific soil analysis report(s) will be required to identify the concentration of chemicals present in the soil at the SFERP location and along the wastewater pipeline alignment that would be excavated for construction. Any additional report(s) will be prepared by knowledgeable, certified professionals and will be submitted to the SFDPH and the SFBRWQCB per the RMP/SMP.

A deed restriction is currently in place for the MUNI property. This deed restriction requires that owners or lessee's of the property to comply with a site-specific RMP/SMP. Under the RMP/SMP (that is administered by the San Francisco Bay RWQCB), the following general risk management practices must be taken before, during, and after development of the MUNI subsite:

- Provide site security.
- Develop and implement a site-specific health and safety plan prior to any development activities at the site.
- Provide adequate dust control measures during construction.
- Minimize groundwater contact by construction workers.
- After site development, maintain covering on the site (asphalt or two feet of clean fill), implement management protocols for future subsurface development, maintain groundwater use restrictions, and agency notification in the event of a change in property use.

Assuming that the City and the SFBRWQCB agree on extending the MUNI RMP/SMP to the SFERP site, the RMP/SMP will be used during construction and future maintenance of the SFERP. The RMP/SMP (1) assesses potential environmental and health and safety risks; (2) recommends mitigation measures, if any are necessary, that would be protective of workers and visitors to the SFERP facility; (3) recommends measures to mitigate the risks

identified; (4) identifies appropriate waste disposal and handling requirements; and (5) presents criteria for onsite reuse of soil. If required, the recommended measures will be completed during construction and upon completion, the City will prepare a certification report stating that all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified.

The construction contract for the project will also include a provision that if previously unidentified areas of contamination are identified during construction, as indicated by discolored soil, odor, or some other condition, the contractor shall have a soil sample taken and submitted for laboratory analysis and stop work in that particular area until the results of the soil sample are known and proper material handling instructions can be determined.

The City will also comply with the onside deed restriction and site-specific Final Risk Management Plan and Site Management Plan as described in Subsection 8.13, Waste Management.

8.9.4.2.2 Laydown Area. The approximately 8.5-acre construction laydown area is located directly east across Maryland Street about 200 feet north of Cesar Chavez Street (see Figure 8.9-1). The site, under the control of the Port Authority, is a previously disturbed, relatively flat, vacant parcel of land. The site has been used in the past for storage of construction material and now is being used temporary storage of shipping containers. According to Figure 8.9-1, the laydown area soil type is 134—Urban Land-Orthents, reclaimed complex with 0 to 2 percent slopes. As described below, this soil has low erosion potential. Since the erosion characteristics of the soil type at the laydown area are minimal, very little soil erosion is expected during the construction period. In addition, BMPs will be implemented during construction, as described in Subsection 8.9.5 of this Supplement and a soil and erosion plan will be prepared to ensure soil loss is minimized. Consequently, as described in this subsection, cumulative impacts are also expected to be negligible. Monitoring will involve inspections to ensure that the BMPs described in the erosion and sediment control plan are properly implemented and effective.

Prior to use as the construction laydown area, minimal grading is expected since the site is flat. Currently, runoff from the laydown area either drains directly to the Bay via overland flow or through existing stormwater drains or percolates into the ground. However, the site will be graveled to provide all weather use and further minimize soil erosion potential. Heavy equipment stored onsite will be placed on dunnage to protect it from ground moisture. Once construction is completed, the gravel will either be removed from the site or left in place at the discretion of the Port Authority.

In addition to the gravel surface, other erosion control practices, if necessary, will be included in the Erosion and Sediment Control Plan to be prepared for the entirety of SFERP construction (see Subsection 8.14.6.1). Because the laydown area drains to the Bay, the stormwater runoff will be regulated under an existing NPDES permit held by the Port of San Francisco and its Stormwater Management Plan. These require preparation of a Stormwater Pollution Prevention Plan by the project.

8.9.4.3 Operation

Operation of the SFERP plant would not result in impacts to the soil from erosion or compaction. Routine vehicle traffic during plant operation will be limited to existing roads,

all of which are paved, and standard operational activities should not involve the disruption of soil. Therefore, impacts to soil from project operations would be less than significant.

8.9.4.4 Effects of Generating Facility Emissions on Soil-Vegetation Systems

There is a concern in some areas that emissions from a generating facility, principally nitrogen (NO_x) from the combustors or drift from the cooling towers, would have an adverse effect on soil-vegetation systems in the project vicinity. This is principally a concern where environments that are highly sensitive to nutrients or salts, such as serpentine habitats, are downwind of the project.

In this case, the dominant land use around the project is urban and the serpentine habitats in the project area are all developed for industrial, commercial, or residential uses. The addition of small amounts of nitrogen to the industrial and commercial areas would be insignificant because of the paucity of vegetation in these areas. Within the more vegetated residential areas, the addition of small amounts of nitrogen would be insignificant within the context of fertilizers, herbicides, and pesticides typically used by homeowners.

8.9.4.5 Cumulative Effects

As previously described, the effects on soil erosion, sedimentation, and compaction associated with the construction and operation of the SFERP are not considered to be significant. Therefore, the cumulative impacts of the proposed SFERP would be negligible. Impacts related to the excavation of contaminated soils would not be significant because all excavated materials will be handled in accordance with the SMIP, as discussed in Subsection 8.9.4.2.

8.9.5 Mitigation Measures

Erosion control measures would be required during construction to help maintain water quality, protect property from erosion damage, and prevent accelerated soil erosion or dust generation that destroys soil productivity and soil capacity.

8.9.5.1 Temporary Erosion Control Measures

Temporary erosion control measures would be implemented before construction begins, and would be evaluated and maintained during construction. These measures typically include revegetation, mulching, physical stabilization, dust suppression, berms, ditches, and sediment barriers. These measures would be removed from the site after the completion of construction.

The project linear features will be constructed within the rights-of-way associated with the following paved streets: 25th Street, Michigan Street, 24th Street, Illinois Street, and Cesar Chavez Street and possibly 22nd Street. Temporary erosion control might include asphalt patching until permanent paving can be completed. If required on non-paved areas disturbed by the pipeline construction, revegetation would be accomplished using locally prevalent, fast-growing plant species compatible with adjacent existing plant species.

During construction of the project and the related linear facilities, dust erosion control measures would be implemented to minimize the wind-blown erosion of soil from the site.

Water of a quality equal to, or better than, either existing surface runoff or irrigation water would be sprayed on the soil in construction areas to control dust during revegetation.

Sediment barriers slow runoff and trap sediment. Sediment barriers include straw bales, sand bags, straw wattles, and silt levees. They are generally placed below disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Sediment barriers are often placed around sensitive areas; such as wetlands, creeks, or storm drains; to prevent contamination by sediment-laden water.

The site will be constructed on relatively level ground; therefore, it is not considered necessary to place barriers around the property boundary. However, some barriers would be placed in locations where offsite drainage could occur to prevent sediment from leaving the site. If used, sediment barriers would be properly installed (staked and keyed), then removed or used as mulch after construction. Runoff detention basins, drainage diversions, and other large-scale sediment traps are not considered necessary due to the level topography and surrounding paved areas. Any soil stockpiles, including sediment barriers around the base of the stockpiles, would be stabilized and covered. These methods can also be employed during trenching operations for the recycled water supply line.

8.9.5.2 Permanent Erosion Control Measures

Permanent erosion control measures on the site will include graveling, paving, and drainage systems.

8.9.6 Permits and Agency Contacts

Permits required for the project, the responsible agencies, and proposed schedule are shown in Table 8.9-6. A construction permit, including a grading permit, will be obtained from the City before construction begins. Other required permits include an Industrial Wastewater Discharge Permit, as discussed in Subsection 8.14, Water Resources.

TABLE 8.9-6
Permits and Agency Contacts for SFERP Soils

Permit or Approval	Schedule	Agency Contact	Applicability
Approval of grading plan; issuance of construction and grading permits	Prior to construction	None identified CCSF Department of Public Works, Bureau of Building Inspection 1660 Mission Street, 6th floor San Francisco, CA 94103-2414 (415) 558-6087	Grading, excavation, and erosion control plan for site
Hazardous waste	Prior to construction	Mardeeta Jones CCSF Department of Public Health 101 Grove Street San Francisco, CA 94102 (415) 252-3938	Approval of Site Mitigation and Implementation Plan
Erosion and Sediment Control Plan	Prior to construction	John Mundy Port of San Francisco, Pier 1 San Francisco, CA 94111	Regulation of stormwater discharge from site and linear facilities during construction

8.9.7 References

AGS, Inc. 1999. Final Geotechnical Study Report, MUNI Metro East Light Rail Vehicle Maintenance and Operation Facility. Prepared for City and County of San Francisco Public Transportation Commission and Public Transportation Department. August.

Bay Area Air Quality Management District (BAAQMD). 2005. http://www.baaqmd.gov/pmt/handbook/s12c03fr.htm.

California Department of Conservation (CDC). 2003. Farmland Mapping and Monitoring Program Statistics web page at http://www.consrv.ca.gov/dlrp/FMMP/fmmp_stats.htm.

Geomatrix Consultants, Inc. 2000. *Additional Site Characterization, Potrero Power Plant Site, 1201 Illinois Street, San Francisco, California*. April.

Jones and Stokes. 2003. *Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module*. May.

Natural Resources Conservation Service (NRCS). 1983. *National Engineering Handbook.*

Natural Resources Conservation Service (NRCS). 1991. *Soil Survey of San Mateo County, Eastern Part, and San Francisco County, California.* May.

Lee, Tommy. 2004. Personal communication between Tommy Lee, Bureau of Environmental Regulation and Management, and CH2M HILL.

South Coast Air Quality Management District. 1993. *CEQA Air Quality Handbook*. November.

State Water Resources Control Board (SWRCB). 1999. General Construction Permit.

Tham, S. 2003. Personal communication between CH2M HILL and Simon Tham, Code Analyst, San Francisco Department of Building Inspection. December 5.

Wagner, D. L., E. J. Bortugno, and R. D. McJunkin. 1991. *Geologic Map of the San Francisco-San Jose Quadrangle, California*. California Division of Mines and Geology, Regional Geologic Map Series, 1:250,000 scale.

U.S Environmental Protection Agency (USEPA). 1995. *Compilation of Air Pollutant Emission Factors AP-42*. Volume I: Stationary Point and Area Sources. Fifth Edition. January.

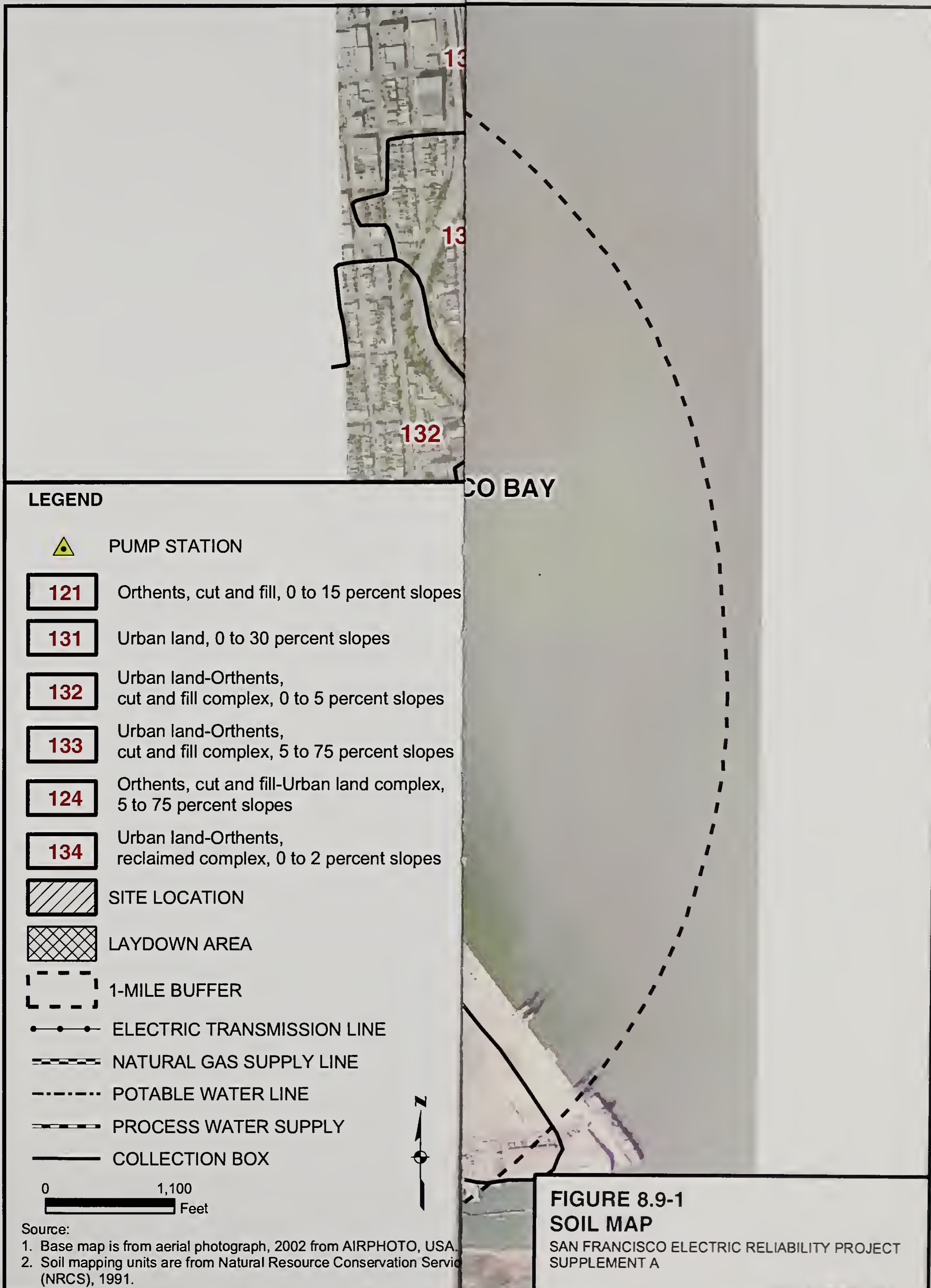

FIGURE 8.9-1
SOIL MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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FIGURE 8.9-1
SOIL MAP
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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SUBSECTION 8.10

Traffic and Transportation

8.10 Traffic and Transportation

This section assesses transportation impacts associated with the proposed project. The analysis primarily quantifies impacts on intersection levels of service expected during construction (the addition of approximately 506 maximum daily vehicles including construction workers and trucks) of the proposed project. Additional transportation factors examined in this section include pedestrian and bicyclist impacts, safety, goods movement, and any potential impacts to air, rail, and waterborne transportation networks.

Descriptions of existing transportation facilities in proximity of the proposed project and an analysis of the proposed project's potential impacts on the existing transportation network are provided. The intersection level of service (LOS) analysis examines the worst-case scenario during construction activities (which would occur for a 2-month duration) to the local study area intersections. The operation of the proposed project would include relatively few peak hour trips, which would be associated with permanent employees (11 employees, or 11 morning and 11 evening peak hour trips). Once these employee peak hour trips are distributed on the street network, traffic impacts would be immeasurable due to the relatively low volume of traffic generated. An additional 60 trips are anticipated to occur throughout the workday (i.e., materials deliveries, visitors, work-related business trips), but not during the critical peak commute hours. An LOS analysis is also provided to assess cumulative impacts.

Information sources include traffic counts, data provided by the City of San Francisco's Department of Parking and Transportation (DPT), the California Department of Transportation (Caltrans) and field observations. This subsection also discusses applicable laws, ordinances, and regulations (LORS) relevant to the potential transportation impacts caused by the proposed project.

8.10.1 Laws, Ordinances, Regulations and Standards

LORS related to traffic and transportation are summarized in the following subsections.

8.10.1.1 Federal

- Title 49, Code of Federal Regulations (CFR), Sections 171-177 (49 CFR 171-177), governs the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.
- 49 CFR 350-399, and Appendices A-G, Federal Motor Carrier Safety Regulations, address safety considerations for the transport of goods, materials, and substances over public highways.
- 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, directs the U.S. Department of Transportation to establish criteria and regulations for the safe transportation of hazardous materials.

8.10.1.2 State

State laws that apply to this project include the following sections of this California Vehicle Code (CVC), unless specified otherwise:

- California Street and Highways Code (S&HC), Sections 660, 670, 1450, 1460 et seq., 1470, and 1480, regulates right-of-way encroachment and granting of permits for encroachments on state and county roads.
- Sections 13369, 15275, and 15278 address the licensing of drivers and classifications of licenses required for operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are addressed.
- Sections 25160 et seq. describe requirements for the safe transport of hazardous materials.
- Sections 2500-2505 authorize the issuance of licenses by the Commissioner of the California Highway Patrol (CHP) to transport hazardous materials, including explosives.
- Sections 31303-31309 regulate the highway transportation of hazardous materials, routes used, and restrictions. CVC Section 31303 requires hazardous materials to be transported on state or interstate highways that offer the shortest overall transit time possible.
- Sections 31600-31620 regulate the transportation of explosive materials.
- Sections 32000-32053 regulate the licensing of carriers of hazardous materials and include noticing requirements.
- Sections 32100-32109 establish special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. CVC Section 32105 requires shippers of inhalation or explosive materials to contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook specifying approved routes.
- Sections 34000-34121 establish special requirements for transporting flammable and combustible liquids over public roads and highways.
- Sections 34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5, and 34510-11 regulate the safe operation of vehicles, including those used to transport hazardous materials.
- S&HC, Sections 117 and 660-72, and CVC, Sections 35780 et seq., require permits to transport oversized loads on county roads. California S&HC Sections 117 and 660 to 711 requires permits for any construction, maintenance, or repair involving encroachment on state highway rights-of-way. CVC Section 35780 requires approval for a permit to transport oversized or excessive loads over state highways.
- California State Planning Law, Government Code Section 65302, requires each city and county to adopt a General Plan, consisting of seven mandatory elements, to guide its physical development. Section 65302(b) requires that a circulation element be one of the mandatory elements.
- All construction in the public right-of-way will need to comply with the "Manual of Traffic Controls for Construction and Maintenance of Work Zones" (Caltrans, 1996).

- California Department of Transportation weight and load limitations for state highways apply to all state and local roadways. The weight and load limitations are specified in the CVC Sections 35550 to 35559. The following provisions, from the CVC, apply to all roadways and are therefore applicable to this project.

  General Provisions:

  - The gross weight imposed upon the highway by the wheels on any axle of a vehicle shall not exceed 20,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle, and resting upon the roadway, shall not exceed 10,500 pounds.
  - The maximum wheel load is the lesser of the following: a) the load limit established by the tire manufacturer, or b) a load of 620 pounds per lateral inch of tire width, as determined by the manufacturer's rated tire width.

  Vehicles with Trailers or Semitrailers:

  - The gross weight imposed upon the highway by the wheels on any one axle of a vehicle shall not exceed 18,000 pounds and the gross weight upon any one wheel, or wheels, supporting one end of an axle and resting upon the roadway, shall not exceed 9,500 pounds, except that the gross weight imposed upon the highway by the wheels on any front steering axle of a motor vehicle shall not exceed 12,500 pounds.

8.10.1.3 Local

The transportation elements of local plans that are applicable to the project are summarized in Table 8.10-1 and in the following subsection.

- The San Francisco General Plan, transportation and circulation elements, sets forth policies that are applicable to the project. They are as follows:
  - The City's level of service standards for the state highway system and specific routes of regional significance shall be those standards adopted in the General Plan.
- Regional Transportation Plan (RTP) represents the blueprint for major transportation investments in the Bay Area region over the 30-year period from 2000 to 2030. The plan provides a vision for the regional transportation system, now and in the future, and is designed to achieve specific goals defined by the Association of Bay Area Governments (ABAG).

8.10.1.4 Compliance with Laws, Ordinances, Regulations, and Standards

All applicable LORS and administering agencies are summarized subsequently. Table 8.10-1 describes how the project will comply with all LORS pertaining to traffic and transportation impacts.

TABLE 8.10-1
Compliance with Laws, Ordinances, Regulations, and Standards

Authority	Administering Agency	Requirements	Compliance (Location in AFC where compliance discussed)
49 CFR, Section 171-177 and 350-300 Chapter II, Subchapter C and Chapter III, Subchapter B	U.S. Department of Transportation and Caltrans	Requires proper handling and storage of hazardous materials during transportation.	Project and transportation will comply with all standards for the transportation of hazardous materials.
49 CFR, Section 350-399, and Appendices A-G	U.S. Department of Transportation and Caltrans	Requires transporters to address safety considerations for the transport of goods, materials, and substances over public highways.	Project and transportation will comply with all standards for the transport of goods, materials, and substances.
49 CFR, Section 397.9	U.S. Department of Transportation and Caltrans	Directs the USDOT to establish criteria and regulations for the safe transportation of hazardous materials.	Project and transportation will comply to criteria established by USDOT under the Hazardous Materials Transportation Act of 1974.
CVC §31300 et seq.	Caltrans	Requires transporters to meet proper storage and handling standards for transporting hazardous materials on public roads.	Transporters will comply with standards for transportation of hazardous materials on state highways during construction and operations. The project will conform to CVC §31303 by requiring that shippers of hazardous materials use the shortest route possible to and from the site.
CVC §§31600 – 31620	Caltrans	Regulates the transportation of explosive materials.	The project will conform to CVC 31600 - 31620.
CVC §§32000 – 32053	Caltrans	Regulates the licensing of carriers of hazardous materials and includes noticing requirements.	The project will conform to CVC 32000 - 32053.
CVC §§32100 - 32109 and 32105.	Caltrans	Establishes special requirements for the transportation of substances presenting inhalation hazards and poisonous gases. Requires that shippers of inhalation or explosive materials contact the CHP and apply for a Hazardous Material Transportation License.	The project will conform by requiring shippers of inhalation or explosive materials to contact the CHP and obtain a Hazardous Materials Transportation License.
CVC §§34000 –34121.	Caltrans	Establishes special requirements for the transportation of flammable and combustible liquids over public roads and highways.	The project will conform to CVC §§34000 - 34121.

TABLE 8.10-1
Compliance with Laws, Ordinances, Regulations, and Standards

Authority	Administering Agency	Requirements	Compliance (Location in AFC where compliance discussed)
CVC §§34500, 34501, 34501.2, 34501.3, 34501.4, 34501.10, 34505.5-7, 34506, 34507.5 and 34510-11.	Caltrans	Regulates the safe operation of vehicles, including those used to transport hazardous materials.	The project will conform to these sections in the CVC.
CVC §§35550-35559	Caltrans	Regulates weight and load limitations.	The project will conform to these sections in the CVC.
CVC §§25160 et seq.	Caltrans	Addresses the safe transport of hazardous materials.	The project will conform to these sections in CVC.
CVC §§2500-2505.	Caltrans	Authorizes the issuance of licenses by the Commissioner of the CHP for the transportation of hazardous materials including explosives.	The project will conform to these sections in the CVC.
CVC §§13369, 15275, and 15278.	Caltrans	Addresses the licensing of drivers and classifications of licenses required for the operation of particular types of vehicles. In addition, certificates permitting the operation of vehicles transporting hazardous materials are required.	The project will conform to these sections in the CVC.
S&HC §§117, 660-711	Caltrans	Requires permits from Caltrans for any roadway encroachment during truck transportation and delivery.	Encroachment permits will be obtained by transporters, as required.
CVC §35780; S&HC §660-711; 21 CCR 1411.1-11411.6	Caltrans	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.	Transportation permits will be obtained by transporters for all overloads, as required.
S&HC §§660, 670, 1450, 1460 *et seq.*, 1470, and 1480	Caltrans	Regulates right-of-way encroachment and the granting of permits for encroachments on state and county roads.	The project will conform to these sections in the CVC.
California State Planning Law, Government Code Section 65302	Caltrans	Project must conform to the General Plan.	Project will comply with General Plan.

CCR California Code of Regulations
CFR Code of Federal Regulations
CVC California Vehicle Code
S&HC California Streets and Highways Code

8.10.2 Affected Environment

8.10.2.1 Project Location and Description

The proposed project includes a power generation facility, an underground transmission line and the construction of a water pump station (WPS) at an existing collection station southwest of the project site to a new onsite water treatment system. Figure 8.10-1 (all figures are located at the end of this subsection) illustrates the regional location of the project site and its relative transportation and transit facilities. The study area is bounded by the San Francisco Bay to the east, Evans Avenue/Hunters Point Boulevard to the south, Evans Avenue to the west, and 16th Street to the north. The power generation facility would be located behind the proposed MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, east of Illinois Street, between Cesar Chavez and 25th streets at Michigan Street in the Potrero District of the City of San Francisco (see Figure 8.10-2). The proposed process water supply pipeline and WPS would be installed along Cesar Chavez to Marin Street (Figure 8.10-2). A temporary construction "laydown" area (for staging, equipment, and construction worker parking) will be developed to the east of the power plant site, with access from both 25th Street and Cesar Chavez. The construction crews for the pipeline and underground transmission line would be staged in appropriate areas adjacent to the construction corridors.

The surrounding land uses are primarily warehouses and industrial activities. Port facilities, including dry docks for ship maintenance, lie farther east and south. The proposed facility would result in additional traffic that includes both passenger vehicles related to construction workers and permanent employees, and delivery vehicles transporting commercial equipment, as well as potential impacts related to street closures associated with pipeline installation.

8.10.2.2 Existing Transportation Facilities

8.10.2.2.1 Regional Roadway Facilities. The proposed project lies near primary transportation corridors that traverse the southern and eastern sections of San Francisco, providing access between Peninsula communities and the employment and cultural centers of the City of San Francisco (City). Major freeways in proximity to the proposed project site include Interstate 280 (I-280), U.S. Highway 101 (U.S. 101), and Interstate 80 (I-80).

Interstate 280. I-280 begins in the South of Market (SoMa) district of San Francisco, extends southwest through Daly City, then proceeds south adjacent to suburban Peninsula communities (e.g. Redwood City and Palo Alto) and then to downtown San Jose. I-280 is comprised of 6 to 8 lanes of mixed flow traffic in the area near the proposed project. According to traffic counts conducted by Caltrans in 2003, I-280 carries approximately 92,000 average daily vehicle trips. Based on review of the Metropolitan Transportation Commission (MTC) traffic model, the current peak hour truck percentage on I-280, near Cesar Chavez Street, is approximately 2 percent (MTC, 2004). Access to the project site from I-280 southbound is by the 25th Street exit, while the Cesar Chavez Street exit provides access from I-280 northbound.

U.S. Highway 101. U.S. 101 serves as one of California's primary western arteries, linking San Francisco to Marin County in the north and to the Peninsula in the south. U.S. 101 is

also the primary route serving the San Francisco International Airport (SFO). In the vicinity of the proposed project, U.S. 101 is an 8-lane, limited access freeway. According to traffic counts conducted by Caltrans in 2003, U.S. 101 carries an average of 249,000 vehicles per day in the vicinity of the project site. The current truck percentage on Highway 101, near Cesar Chavez Street, is approximately one percent during the peak hour (MTC, 2004). Access to and from U.S. 101 in the vicinity of the project site is via the Cesar Chavez Street interchange for both northbound and southbound traffic.

Interstate 80. Interstate 80, which merges with U.S. 101 north of Hunters Point Shipyard and southwest of downtown, is generally an east–west freeway, extending from downtown San Francisco in the west, to Sacramento and beyond to the east. The San Francisco-Oakland Bay Bridge is located along this freeway, connecting San Francisco with the East Bay. Per Caltrans, 2003 average daily traffic counts, average daily traffic in the project vicinity (i.e., north of the I-80/U.S. 101 junction) is approximately 197,500 vehicles. The current truck percentage on I-80, near the Highway 101 junction, is approximately one percent during the peak hour (MTC, 2004).

8.10.2.2.2 Local Roadway Facilities. San Francisco has an extensive street grid system that connects the proposed project to downtown, neighboring communities, and the major freeways described above. This network is categorized into three primary classifications: major arterial roadways, secondary arterial roadways, and collector roads. Major arterial roadways collect and distribute freeway-bound traffic to accommodate intra-city travel and other medium- and long-distance trips. Secondary arterials and collector roads collect and distribute traffic generated in the area by major arterial roadways.

Major and secondary arterial roadways within the study area that provide access to and from the project area include Third Street, Cesar Chavez Street, 16th Street, and Evans Avenue. These roadways are briefly described below, while Figure 8.10-2 shows the arrangement of the local roadway network in the vicinity of the project site. Table 8.10-2 provides classification and traffic volume data for the local and regional roadways.

TABLE 8.10-2
Characteristics of Roadways in Project Study Area

Name	Classification [a]	Average Daily Traffic Volume	Peak Hour Volume
Local Roadways			
Third Street	Major Arterial	21,000 [b]	2,750 [c,f]
16th Street	Secondary Arterial	13,000 [c]	870 [c]
23rd Street	Collector Road	3,000 [d]	200 [c]
25th Street	Collector Road	3,700 [d]	250 [c]
Evans Avenue	Major Arterial	14,600 [b]	1,640 [c]
Cesar Chavez Street	Major Arterial	12,000 [b]	1,330 [c]
Illinois Street	Collector Road	3,400 [b]	230 [d]
Pennsylvania Avenue	Collector Road	19,000 [c]	1,270 [d]

TABLE 8.10-2
Characteristics of Roadways in Project Study Area

Name	Classification [a]	Average Daily Traffic Volume	Peak Hour Volume
Regional Roadways			
I-280 (post mile 6.05) [e]	Freeway	92,000	7,050
U.S. 101 (post mile 2.92) [e]	Freeway	249,000	15,650
I-80 (post mile 4.4) [e]	Freeway	197,500	12,500

Notes:
[a] Source: Vehicular Street Map, Transportation Element, City and County of San Francisco, 1995.
[b] Source: Korve Engineering, 1999.
[c] Source: Daily and peak hour volumes from City of San Francisco Department of Parking and Transportation (DPT), 2004. Peak hour volumes were obtained from the City's Traffic model (Synchro).
[d] Peak hour volume and ADT were determined based on 6.7% K-factor of adjacent streets.
[e] Source: State of California, Department of Transportation (Caltrans), 2003.
[f] Peak hour volume was calculated by averaging the peak hour volume for multiple segments.

Third Street. Third Street functions as the principal north–south arterial within the study area. Third Street extends north from its interchange with U.S. 101 and Bayshore Boulevard to its intersection with Market Street. It serves as a main commercial street, as well as a primary access route to industrial development along San Francisco's southern waterfront, carrying approximately 21,000 vehicles per day (Korve Engineering, 1999). Based on the MTC, the current peak hour truck percentage on Third Street in the project vicinity is 2 percent (MTC, 2004). The Transportation Element of the San Francisco General Plan designates Third Street as a Major Arterial and Primary Transit Route (CCSF Planning Department, 1995). The plan also names Third Street as a Neighborhood Commercial Street and a Citywide Bicycle Route. Per the DPT, there are no vehicle weight and load restrictions on Third Street in the project vicinity.

In terms of physical design, Third Street in the project area is undergoing construction of the Third Street Light Rail Transit (LRT) Improvement Project. Third Street was reconstructed from a 6-lane arterial to a 4-lane arterial with two 11-foot-wide traffic lanes and an 8-foot shoulder in each direction. A center median contains two LRT tracks. In addition, separate left-turn storage lanes are provided at intersections with major arterial roadways but are not provided at minor street intersections. On-street parking is generally allowed on both sides of the street.

The full Third Street LRT extension to the southern City limits will be completed and in operation by late 2005 (Howard, 2004).

Cesar Chavez Street. Cesar Chavez Street (formerly Army Street) is a major arterial and a Citywide Bicycle Route carrying approximately 12,000 vehicles per day (Korve Engineering, 1999). Cesar Chavez Street has direct access to the project site and the construction laydown area. The current peak hour truck percentage on Cesar Chavez Street in the project vicinity is 2 percent (MTC, 2004). This 4-lane major arterial extends to the west, traversing the Mission District until Guerrero Street, where it becomes a local street. Cesar Chavez Street provides direct access to both I-280 and U.S. 101. Vehicles exiting on Cesar Chavez Street, going eastbound, from southbound U.S. 101 are subject to an exit ramp with a tight turn radius. The tight turn radius of this ramp is a non-standard design that may have safety issues; and it is not

accessible for trucks due to horizontal and vertical constraints (curve radius and overhead clearance). Cesar Chavez Street proceeds to Third Street, from which vehicles traveling to the proposed project site can continue north to 23rd Street to access the SFERP facility. Per the DPT, there are no vehicle weight and load restrictions on Cesar Chavez Street in the project vicinity.

16th Street. Sixteenth Street functions as a secondary east-west arterial between Market Street and Third Street. Sixteenth Street provides access to the project site from the north and west, with access through the Mission District. Land uses along 16th Street are primarily neighborhood street-front retail/commercial with medium- to high-density residential units. Where 16th Street intersects with Third Street, the area becomes predominantly light industrial. In the project vicinity, 16th Street carries approximately 13,000 vehicles per day (City of San Francisco DPT, 2004), and there are no vehicle weight and load restrictions per the DPT. The current peak hour truck percentage on 16th Street in the project vicinity is one percent (MTC, 2004).

23rd Street. In the project vicinity, 23rd Street carries approximately 3,000 average daily vehicles (estimated by CH2M HILL). This roadway is undivided and provides one lane of travel in each direction, and there are no vehicle weight and load restrictions on this street in the project vicinity. In addition, there is on-street parking on both sides of the street, and there is a posted speed limit of 25 miles per hour (mph). The intersection of Third Street and 23rd Street is signalized.

25th Street. Although the site and construction laydown area can be accessed from Cesar Chavez Street, to provide a worse case analysis it is assumed that 25th Street would provide primary access to the project site, construction laydown area (i.e., staging and construction worker parking area), and access to other adjacent industrial properties. This roadway is undivided and provides one lane of travel in each direction. 25th Street carries approximately 3,700 average vehicles per day (estimated by CH2M HILL). In addition, there are no vehicle weight and load restrictions, there is on-street parking on both sides of the street, and there is a posted speed limit of 25 mph along 25th Street in the project vicinity. The intersection of Third Street and 25th Street is signalized. Access to I-280 is provided via 25th Street, which leads directly to I-280 northbound at Indiana Street, or via Pennsylvania Avenue to reach I-280 southbound. Traffic headed northbound on U.S. 101 can access the ramp directly from Cesar Chavez Street westbound. However, traffic headed southbound must turn around at Bryant Street and return eastbound along Cesar Chavez Street.

Illinois Street. Illinois Street is a wide 2-lane undivided roadway west of the project site. Illinois Street carries approximately 3,400 vehicles per day (Korve Engineering, 1999). Traffic is controlled at the intersections of Illinois Street and 23rd and 25th streets by a two-way stop sign with 23rd and 25th streets serving as the minor (stopped) streets. Land uses along this street in the immediate vicinity of the proposed project consist of warehouses and industrial uses. Additionally, per the DPT, there are no vehicle weight and load restrictions on Illinois Street in the project vicinity.

Pennsylvania Avenue. Pennsylvania Avenue is a north-south 2-lane undivided roadway west of the project site. It carries approximately 19,000 vehicles per day (City of San Francisco DPT, 2004). The segment of Pennsylvania Avenue between 23rd Street and Cesar Chavez Street provides freeway on- and off-ramp access to and from southbound I-280. Land uses along this

section of roadway are primarily light industrial. Per the DPT, there are no vehicle weight and load restrictions on Pennsylvania Avenue in the project vicinity.

8.10.2.3 Existing and Future Baseline Intersection Levels of Service

Level of service (LOS),measured by the average control delay at an intersection, is the performance measure used by DPT for assessing intersections operations. The DPT (like most other jurisdictions) analyzes traffic impacts by peak hour intersection capacity and operations, rather than daily roadway capacity. Intersection level of service is identified through a letter designation, varying from LOS A (less than 10 seconds of delay) to LOS F (greater than 80 seconds of delay) as described in Table 8.10-3. For urban settings, LOS E (delays of 55 to 80 seconds) represents the least tolerable acceptable condition.

TABLE 8.10-3
Level of Service Criteria for Signalized Intersections

Level of Service	Average Delay (seconds per vehicle)	Traffic Flow Characteristics
A	≤ 10	Most vehicles arrive during the green phase and do not stop at all.
B	> 10 to ≤ 20	More vehicles stop, causing higher delay.
C	> 20 to ≤ 35	Vehicle stopping is significant, but many still pass through the intersection without stopping.
D	> 35 to ≤ 55	Many vehicles stop, and the influence of congestion becomes more noticeable.
E	> 55 to ≤ 80	Very few vehicles pass through without stopping.
F	> 80	Considered unacceptable to most drivers; intersection is not necessarily over capacity even though arrivals exceed capacity of lane groups.

Source: Highway Capacity Model, Transportation Research Board, 2000

This analysis focuses on the following study area intersections during a typical weekday peak hour between 7:00 a.m. to 9:00 a.m. (morning peak), and 4:00 p.m. to 6:00 p.m. (evening peak).

- Third Street/16th Street
- Third Street/20th Street
- Third Street/23rd Street
- Third Street/25th Street
- Third Street/Cesar Chavez Street
- Third Street/Evans Avenue
- Evans Avenue/Cesar Chavez Street

Traffic conditions were evaluated using the Synchro software (Trafficware, Version 5). Synchro is a traffic operations analysis tool that incorporates the methodology of Transportation Research Board's 2000 *Highway Capacity Manual* (TRB, 2000). This program assigns a LOS designation based upon average vehicle delay. This methodology complies with the evaluation requirements of the City DPT.

Intersection conditions were evaluated for the following scenarios:

- Existing (2000) conditions
- Baseline (2007) conditions

- Baseline plus Project Construction Phase conditions (Baseline plus Project Construction Phase Conditions is discussed in Subsection 8.10.3.1.)
- Cumulative (2015) conditions

LOS was calculated for most intersections in the study area. Peak hour traffic volume data are not available through the DPT for Pennsylvania Avenue intersections. However, it is expected that traffic in this immediate area would not be congested since surrounding land uses are industrial and industrial land uses tend to generate low volumes of traffic. Pennsylvania Avenue, between 23rd Street and Cesar Chavez Street, primarily provides access to and from the I-280 southbound on- and off-ramps. The turning movements at these intersections mainly provide access to I-280 and as such, there are few conflicts at these intersections.

8.10.2.3.1 Existing Conditions. Figure 8.10-3 illustrates the existing a.m. and p.m. peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 shows the results of the existing condition traffic analysis. Under existing conditions, the studied intersections operate at LOS D or better for both the morning and evening peak periods. The intersections within proximity to the project, Third Street/20th Street and Third Street/25th Street currently operate at LOS A and LOS B during the a.m. and p.m. peak hours, respectively. The intersection of Third Street/Evans Avenue operates at LOS D (37.3 seconds delay) during the morning peak hour.

TABLE 8.10-4
Level of Service Summary for Existing, Baseline 2007, and Cumulative (2015) Conditions

Intersection	Peak Hour	Existing (2000)		Baseline (2007)		Cumulative (2015)	
		LOS	Delay [a]	LOS	Delay *	LOS	Delay*
Third Street/16th Street	Morning	B	12.1	C	22.8	C	25.7
	Evening	B	14.5	B	16.5	C	22.0
Third Street/20th Street	Morning	A	3.1	A	2.2	C	20.1
	Evening	A	2.8	A	3.7	C	27.4
Third Street/23rd Street	Morning	A	3.4	A	2.9	C	27.5
	Evening	A	4.7	A	6.0	C	22.6
Third Street/25th Street	Morning	B	11.9	A	5.5	B	13.2
	Evening	B	11.3	B	11.0	B	11.7
Third Street/Cesar Chavez Street	Morning	C	27.1	D	40.8	D	39.9
	Evening	C	24.5	D	39.1	D	40.0
Third Street/Evans Avenue	Morning	D	37.3	D	44.1	D	44.7
	Evening	C	24.0	C	33.5	D	36.0
Evans Avenue/Cesar Chavez Street	Morning	B	13.6	B	14.1	B	16.6
	Evening	B	19.4	C	29.9	C	31.1

Note:
*Delay in seconds per vehicle.

In addition, a freeway mainline level of service analysis was prepared for the study area freeway segments of I-280 (at Cesar Chavez Street), Highway 101 (at Cesar Chavez Street), and I-80 (at U.S. 101 junction). This analysis is consistent with the methodology provided in the Highway Capacity Manual. Currently, the segment of I-280 in the project area is operating at a LOS C, while Highway 101 and I-80 in the project study area are both operating at LOS F.

8.10.2.3.2 Cumulative (2015) Conditions. Cumulative 2015 peak hour traffic volumes were provided by the DPT and based on growth and development trends in the Potrero area of the City, as determined by DPT transportation modeling staff. The 2015 traffic conditions would be associated with the operations of the proposed project. The operations of the proposed project would generate a total of 82 daily trips; 11 during the morning peak hour, 11 during the evening peak hour trips and the remainder during off-peak hours. This addition of traffic in the study area will not have a measurable effect on intersection LOS once the trips are distributed throughout the street network.

Figure 8.10-5 illustrates the 2015 cumulative morning and evening peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 provides the 2015 intersection LOS at the study area intersections. Other than the operation of the MUNI N-Judah light rail line through the center median of Third Street, no additional intersection improvements are planned for the study area intersections. Based on the LOS analysis of the 2015 cumulative conditions, all of the study area intersections are forecast to continue to operate at LOS D or better for both morning and evening peak hours. Additional traffic from operations will have no significant impact on LOS.

The freeway mainline LOS analysis was run for the 2015 cumulative condition. Based on DPT growth and development projects that were included in the analysis, LOS on the I-280 study area segment would degrade to LOS D in the 2015 condition. Both Highway 101 and I-80 would continue to operate at LOS F in the 2015 condition.

8.10.2.3.3 Baseline (2007) Conditions. The cumulative 2015 traffic volumes provided the basis of estimating the 2007 traffic volumes. Background (2007) morning and evening peak hour volumes, consistent with the planned year of project construction, were interpolated assuming straight line growth from existing (2000) and future (2015) volumes. Based on the interpolation of DPT's cumulative traffic volumes, the average growth rate applied at the intersection traffic volumes in the study area is approximately 2.6 percent per year.

Figure 8.10-4 illustrates the 2007 baseline (without project construction traffic) morning and evening peak hour traffic volumes, intersection geometrics and controls, while Table 8.10-4 shows the results of the 2007 baseline traffic analysis. No additional intersection improvements are planned for the study area intersections, and therefore, the intersection geometrics remain the same as the existing condition. Based on the LOS analysis of the 2007 baseline conditions, all of the study area intersections are forecast to continue to operate at LOS D or better for both morning and evening peak hours.

The study area freeway mainline segments would continue to operate at similar LOS as the existing condition (I-280 at LOS C, Highway 101 at LOS F, and I-80 at LOS F).

8.10.2.4 Public Transportation

San Francisco is a transit hub served by local and regional bus, rail, and ferry services. Regional service connects downtown San Francisco with the surrounding suburban areas. San Mateo County Transit District (SamTrans) and Bay Area Rapid Transit (BART) serve the Peninsula communities south of the SFERP facility. AC Transit buses and BART serve the East Bay, while Golden Gate Transit serves the North Bay communities. Ferry service also carries passengers to downtown San Francisco from coastal North and East Bay communities. In central eastern San Francisco, BART runs north-south along Mission Street, with the station nearest to the project site located at 24th Street.

8.10.2.4.1 San Francisco Municipal Railway. The San Francisco Municipal Railway (MUNI) currently carries 219 million passengers per year on 85 transit lines. The system provides approximately 5,300 stops throughout San Francisco, with lines providing extensive coverage to all San Francisco neighborhoods. MUNI connects with other Bay Area transit service providers at major transfer centers including the Ferry Building, Transbay Terminal, Embarcadero, and Civic Center BART stations along Market Street, and the Stonestown Shopping Center, and the Daly City BART station. MUNI is planning to build a light rail maintenance and operation facility adjacent to the project site on Illinois Street.

Major MUNI routes in the vicinity of the project site serve both north-south travel originating in downtown San Francisco or San Mateo counties, and cross-town travel. Below are descriptions of the major routes that serve these travel patterns. Route N – Judah serves as the only light-rail transit (LRT) in the study area, while other MUNI routes are bus routes.

Route N – Judah (Light-Rail Transit). This LRT route currently travels in a general east-west fashion from Ocean Beach, through downtown and the Embarcadero, to the Caltrain station at Fourth and King streets. Route N has major stops at the MUNI and BART stations at Van Ness, Civic Center, Powell, Montgomery, and Embarcadero. Route N provides 5- to 9-minute headways during the morning peak period, and 4- to 12-minute headways during the evening peak period.

The extension of the MUNI Third Street LRT Line past the Caltrain Station, south to the southern City limits, is currently under construction in the vicinity of the project site. Specific portions of this extension project were completed and operational in 2004, with full completion of the extension to the City's southern limits planned for completion by late 2005 (Garcia 2005).

Route #15 - Third Street. This route functions as the primary transit line serving the Central Basin and Hunters Point regions. It carries passengers through downtown San Francisco, extending north to Fisherman's Wharf and south to Hunters Point. Route #15 allows connections with other transportation services that reach throughout the Bay Area including Caltrain (terminal at 4th and Townsend streets and Paul Avenue station), BART, and the MUNI subway system (via the Montgomery and Embarcadero stations). Route #15 provides frequent service with articulated buses, running on 5- to 8-minute intervals during peak hours and 10- to 15-minute intervals during off-peak hours.

Route #22 – Fillmore. This route travels from Fillmore and Bay streets in the Marina District south through Pacific Heights and Mission Dolores before heading southeast to Third Street. The route turns north at 20th Street, stopping 2 blocks from the proposed project site. Route

#22 provides service at 7- to 12-minute intervals during the morning peak period and at 5- to 11-minute intervals during the evening peak period.

Route #48 – Quintara/24th Street. This route provides crosstown service from the West Portal community to Potrero Hill. This line accesses the MUNI subway at the West Portal Station, as well as BART at 24th and Mission Streets. Passengers are transported within one block of the proposed project site, with a stop at 22nd and Illinois Streets. This line also connects to Route #15 and Route #9, while passing near Caltrain's 22nd Street depot. Route #48 offers service at 6- to 15-minute intervals during the morning peak period, and at 10- to 12-minute intervals during the evening peak period.

8.10.2.4.2 Caltrain. Caltrain provides commuter rail service between Santa Clara, San Mateo, and San Francisco counties. The station closest to the project site is the 22nd Street and Pennsylvania Avenue station. This station is approximately 6 blocks west of the proposed project along MUNI Route #48, described above. During the week, trains connect this station to Peninsula communities, while all 32 trains continue northbound to the final Caltrain stop at 4th and Townsend Streets. Service runs on 30-minute intervals during the a.m. and p.m. peak periods. During the weekends, 13 trains run approximately every hour on Saturday, while 10 trains run every 1 to 2 hours on Sunday.

8.10.2.4.3 Bay Area Ferries. Ferry service is provided between Vallejo, Alameda, Oakland, Tiburon, Sausalito, and downtown San Francisco. Presently MUNI Route #15 provides connections to ferry services only in Fisherman's Wharf and at Piers 41 and 43. In the project vicinity, MUNI Route #15 operates southbound on Second Street and northbound on Third Street. Beginning in 2004, MUNI's new Third Street LRT is providing service to Bay Area ferries via connections along the Embarcadero. The following describes the five ferry service providers in the project area.

Vallejo Baylink Ferry. The Red and White Fleet operates this limited commute ferry service from Vallejo to the San Francisco Ferry Building. There are currently 15 trips per weekday in each direction, four of which are via bus, and nine trips per day on weekends, one of which is via bus.

Alameda and Oakland Ferry Service. The Blue and Gold Fleet operates this service, with ferries departing from Alameda and Oakland's Jack London Square for both the San Francisco Ferry Building and Pier 41/Fisherman's Wharf. Thirteen inbound and outbound trips each weekday serve the Ferry Building while 7 inbound and 5 outbound trips serve Pier 41. On the weekends, 4 inbound trips and 5 outbound trips serve the Ferry Building while 6 inbound and outbound trips serve Pier 41.

Harbor Bay Ferry. This ferry provides weekday commuter service between Alameda and the San Francisco Ferry Building. There are six inbound trips and six outbound trips per day.

Red and White Fleet. The Red and White Fleet provides ferry service from San Francisco to Tiburon and Sausalito, Service to these locations is provided from both the Ferry Terminal (during peak commute hours) and from Fisherman's Wharf at Pier 43. Five ferries in each direction travel between San Francisco and Tiburon/Sausalito.

Golden Gate Ferry. This ferry provides daily service between Larkspur and Sausalito in Marin County and the San Francisco Ferry Building. The Larkspur Ferry runs 21 inbound and

outbound trips (one trip in each direction is via bus) on weekdays with one Friday night late ferry in each direction during summer months. On weekends and holidays, there are 5 inbound and outbound trips running on 2-hour intervals during the day. The Sausalito Ferry runs 9 trips in each direction on weekdays with a 10th trip provided during summer months. On weekends and holidays, there are 6 trips in each direction with a 7th trip during summer months.

8.10.2.5 Bicycle and Pedestrian Circulation

There are currently several signed on-street bicycle routes in the project vicinity, but no existing pedestrian trails. A Class III route (on-street bike route; signs only) circles around Monster Park and connects to Third Street, via Gilman, Carroll, Thomas, and Revere avenues. Within the project vicinity, the *San Francisco Master Plan* designates Evans Avenue, Innes Avenue, Cesar Chavez Street, and Third Street as Citywide Bicycle Routes.

Additionally, by December 2005, DPT will be providing Class II (striped) bike lanes on Illinois Street. With the construction of the Third Street Light Rail Line discussed above, cyclists traveling north and south in the Third Street – Illinois Street Corridor would be subject to unsafe conditions on Third Street. Illinois Street is the logical replacement for Third Street as a bicycle route, Illinois Street is one block to the east, and connects to other bicycle routes to the north and south. Since Illinois Street is part of the Bay Trail Plan (see below), the bike lanes would form a continuous connection between Islais Creek and North Beach on bike lanes or paths (Class I, off-street).

Sidewalks exist along Third Street, and with the completion of the Third Street LRT project, more pedestrians are anticipated along Third Street. Sidewalks do not exist on 22nd, 23rd and 25th streets, with shops abutting directly onto the street. Parking space is available on both sides of these streets, requiring that pedestrians walk within travel lanes.

The Bay Trail Plan was adopted by the Association of Bay Area Governments in 1989 pursuant to Senate Bill 100, and provides an alignment that connects the nine-county Bay Area region with a multi-purpose hiking and bicycle trail, along with a set of policies to guide implementation. Consistent with the Bay Trail Plan, Illinois Street is a designated bikeway in the draft Central Waterfront Neighborhood Plan. Illinois Street in the vicinity of the project site is the designated Bay Trail. However, no dedicated facilities (e.g., a striped bike lane) are currently provided in the vicinity of the project.

The Bay Trail Plan proposes an alignment for what will become a 400-mile recreational "ring around the Bay." Approximately one-third of the trail already exists, either as hiking-only paths, hiking and bicycling paths or as on-street bicycle lanes. When completed, the Bay Trail will create connections between more than 130 parks and publicly-accessible open space areas around San Francisco and San Pablo Bays.

8.10.2.6 Airports

San Francisco International Airport (SFO) is approximately 15 miles south of the proposed project site on U.S. 101. SFO can also be reached via BART (transit) and Interstate 380 (I-380) that connects to I-280 (vehicles). In addition, Oakland International Airport (OAK) sits across the Bay, accessible via BART and I-80 across the Bay Bridge, connecting to Interstate 880 (I-880). San Jose International Airport (SJC) lies farther south, accessible via Caltrain and U.S. 101 or I-280.

8.10.2.7 Goods Movement

8.10.2.7.1 Freight Rail Service. Currently no active freight rail service is provided in the immediate vicinity of the proposed project. There is an inactive railroad track operated by the Southern Pacific Corporation (SP) via trackage rights from Caltrain, which connect the Caltrain mainline tracks to the south gate of Hunters Point Shipyard. Currently, the Port of San Francisco (Port) is planning to re-orient freight rail service from Mission Bay to the Port of San Francisco waterfront via the future Illinois Street rail/truck bridge.

Immediately north of Hunters Point Shipyard and the India Basin, an Intermodal Container Transfer Facility (ICTF) branch track serves the Evergreen Pier 90 to Pier 96 area. The ICTF branch diverges from the Caltrain mainline just north of Tunnel #3 in the northbound direction.

8.10.2.7.2 Truck Access. The largely industrial land uses near the project site generate truck traffic. A designated truck route between U.S. 101 and I-280 and the project site exists along Cesar Chavez Street, Evans Avenue, and Third Street (north of Evans Avenue). Trucks weighing more than 11,000 pounds are prohibited on Third Street between Evans Avenue and Carroll Avenue and no through trucks are allowed on Third Street between Jamestown Avenue and Jerrold Avenue.

8.10.2.8 Planned Transportation Improvements

8.10.2.8.1 Third Street Light Rail Project. The MUNI Third Street LRT Line is currently under construction within the vicinity of the proposed project. This MUNI project will provide a light rail line down Third Street to the City's southern limit, and provide a 4-lane arterial with two 11-foot-wide traffic lanes and 8-foot shoulders in each direction. An approximately 32-foot-wide center median would contain two LRT tracks for the future extension of the MUNI N Line. As of January 2005, the Third Street LRT construction ended at 22nd Street; however, full LRT extension to the southern City limits will be completed and in operation by late 2005 (Howard, 2004).

In the vicinity of the project, left-turn lanes will remain on Third Street for Evans, Cesar Chavez Street, 25th Street (northbound only), 23rd Street, and 20th Street. In addition to the light rail line, a new Metro Light Rail Vehicle East Operating and Maintenance Facility is planned at Illinois and 25th streets. This facility would store, maintain, and dispatch light rail vehicles on a site of approximately 13 acres adjacent to the SFERP site.

8.10.2.8.2 Bicycle Facility Improvements. DPT's Bicycle Program Manager provided the following information on planned bicycle facility improvements. (Tannen, 2003).

Illinois Street Bicycle Route (16th Street to Cesar Chavez Street). DPT received a Transportation Funding for Clean Air (TFCA) grant from the Bay Area Air Quality Management District (BAAQMD) to provide Class II (striped) bike lanes on Illinois Street. With the construction of the Third Street Light Rail Line, cyclists traveling north and south in the Third Street – Illinois Street Corridor would be subject to unsafe conditions on Third Street. Illinois Street is the logical replacement for Third Street as a bicycle route. It is one block to the east and connects to other bicycle routes to the north and south.

In addition, Illinois Street is part of the Bay Trail bicycle route in San Francisco. The Illinois Street bike lanes would form a continuous connection between Islais Creek and North Beach

on bike lanes or paths (Class I, off-street). The bicycle connection would include the future (funded) Illinois Street Bridge over Islais Creek, the existing Terry A. Francois Boulevard bike lanes, the Pac Bell Park Promenade, and The Embarcadero Promenade bike lanes for a total of 4.75 miles. The Illinois Street bike lane project will be completed by December 2005.

Cesar Chavez Street Bicycle Route (U.S. 101 to I-280). The Cesar Chavez Street bike route would provide for Class II (striped) bike lanes on Cesar Chavez Street, between U.S. 101 and I-280. As a result of this project, existing on-street parking on the north side of Cesar Chavez Street (westbound) would be removed. Colored bike lane treatments across the U.S. 101 and I-280 on- and off-ramps would also be used to help highlight the presence of bicycles across these potential high-conflict areas. This segment would make use of the existing asphalt path underneath U.S. 101. Other crossing treatments would be needed to allow bicyclists to cross safely.

8.10.3 Environmental Consequences

This subsection discusses potential environmental impacts of the proposed project. Potential traffic impacts during construction of the plant, as well as plant operation after construction, have been analyzed. Significance criteria were developed based upon Appendix G of the CEQA *Guidelines*, which identifies significant impacts to be caused by a project if it results in an increase in traffic that is substantial relative to the amount of existing traffic and the capacity of the surrounding roadway network. In addition, impacts are assessed in accordance with the criteria used by the City Planning Department. The more stringent of these two sets of criteria were used to determine project-related impacts.

Project area reconnaissance was performed by CH2M HILL in November 2003 to examine the proposed project area, document roadway characteristics, identify physical constraints, and assess general traffic conditions.

When completed, the operational phase of the proposed project would generate approximately 11 additional employee commutes and other off-peak hour trips (i.e., materials deliveries, visitors, business-related trips), or 82 daily trips. During the peak construction phase, the project is expected to generate approximately 506 average daily construction worker trips. To analyze the "worst-case" scenario, traffic impacts associated with construction traffic were analyzed. Consequently, a quantitative traffic analysis was not conducted for the long-term operations phase since it would generate a low volume of peak hour trips (11 morning and 11 evening peak hour employees trips). This would not have a measurable impact on the study area intersections.

8.10.3.1 Thresholds of Significance

The following are the significance criteria regarding transportation used by the San Francisco Planning Department for the determination of impacts associated with a proposed project:

- The operational impact on signalized intersections is considered significant when project-related traffic causes the intersection level of service to deteriorate from LOS D or better to LOS E or F, or from LOS E to LOS F. The project may result in significant adverse impacts at intersections that operate at LOS E or F under existing conditions depending upon the magnitude of the project's contribution to the worsening of the

average delay per vehicle. In addition, the project would have a significant adverse impact if it would cause major traffic hazards or contribute considerably to cumulative traffic increases that would cause deterioration in levels of service to unacceptable levels.

- San Francisco does not consider parking supply as part of the permanent physical environment. Parking conditions are not static, as parking supply and demand varies from day to day, from day to night, from month to month, etc. Hence, the availability of parking spaces (or lack thereof) is not a permanent physical condition, but changes over time as people change their modes and patterns of travel.

  Parking deficits are considered to be social effects, rather than impacts on the physical environment as defined by CEQA. Under CEQA, a project's social impacts need not be treated as significant impacts on the environment. Environmental documents should, however, address the secondary physical impacts that could be triggered by a social impact (CEQA Guidelines § 15131[a]). The social inconvenience of parking deficits, such as having to hunt for scarce parking spaces, is not an environmental impact, but there may be secondary physical environmental impacts, such as increased traffic congestion at intersections, air quality impacts, safety impacts, or noise impacts caused by congestion. In the experience of San Francisco transportation planners, however, the absence of a ready supply of parking spaces, combined with available alternatives to auto travel (e.g., transit service, taxis, bicycles or travel by foot) and a relatively dense pattern of urban development, induces many drivers to seek and find alternative parking facilities, shift to other modes of travel, or change their overall travel habits. Any such resulting shifts to transit service in particular, would be in keeping with the City's "Transit First" Policy. The City's Transit First Policy, established in the City's Charter Section 16.102 provides that "parking policies for areas well served by public transit shall be designed to encourage travel by public transportation and alternative transportation."

  The transportation analysis accounts for potential secondary effects, such as cars circling and looking for a parking space in areas of limited parking supply, by assuming that all drivers would attempt to find parking at or near the project site and then seek parking farther away if convenient parking is unavailable. Moreover, the secondary effects of drivers searching for parking is typically offset by a reduction in vehicle trips due to others who are aware of constrained parking conditions in a given area. Hence, any secondary environmental impacts which may result from a shortfall in parking in the vicinity of the proposed project would be minor, and the traffic assignments used in the transportation analysis, as well as in the associated air quality, noise and pedestrian safety analyses, reasonably addresses potential secondary effects.

- The project would have a significant effect on the environment if it would cause a substantial increase in transit demand that could not be accommodated by adjacent transit capacity, resulting in unacceptable levels of transit service; or cause a substantial increase in delays or operating costs such that significant adverse impacts in transit service levels could result. With the MUNI and regional transit screenlines analyses, the project would have a significant effect on the transit provider if project-related transit trips would cause the capacity utilization standard to be exceeded during the evening

peak hour. (A screenline is an imaginary line on a map, composed of one or more straight line segments. A screenline can run across a number of network links. It is used to analyze the number of trips or other traffic quantities going from one segment of the network to the other segment divided by the screenline. Hence, it is a method used for evaluating a network.)

- The project would have a significant effect on the environment if it would result in substantial overcrowding on public sidewalks, create potentially hazardous conditions for pedestrians, or otherwise interfere with pedestrian accessibility to the site and adjoining areas.
- The project would have a significant effect on the environment if it would create potentially hazardous conditions for bicyclists or otherwise substantially interfere with bicycle accessibility to the site and adjoining areas.
- A project would have a significant effect on the environment if it would result in a loading demand during the peak hour of loading activities that could not be accommodated within proposed on-site loading facilities or within convenient on-street loading zones, and created potentially hazardous conditions or significant delays affecting traffic, transit, bicycles or pedestrians.
- Construction-related impacts generally would not be considered significant due to their temporary and limited duration.

8.10.3.2 Intersection Levels of Service

8.10.3.2.1 Construction Impacts. Peak hour traffic operations were evaluated for the weekday morning and evening peak periods (7:00 to 9:00 a.m. and 4:00 to 6:00 p.m.) for the local roadway network adjacent to the project site during construction. The peak hour analysis examined the worst-case scenario of the impact of 264 daily workers during construction of the project.

Trip Generation. Construction of the proposed project is anticipated to begin in the 2nd quarter 2006 and last approximately 12 months. A peak workforce would consist of approximately 245 workers at the plant site, and 19 workers along the pipeline and transmission line alignment, each day over a one-month period during the 6th month of construction. While all of the plant construction workers would park at the lay-down area off 25th Street, the linear construction crews would park adjacent to their work sites along the respective alignments.

Construction for the plant and linears would generally be scheduled to occur between 7:00 a.m. and 8:00 p.m., during weekdays, although additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Based on the regular schedule, most worker trips to the project site would occur during the morning (inbound to site) and evening (outbound from site) peak commute hours. The delivery of construction materials and the hauling of materials from the project site would also occur during the day, but not during the peak hours. Table 8.10-5 summarizes the total daily and peak-hour construction vehicle trip generation for the peak construction period.

TABLE 8.10-5
Construction Trip Generation for the Proposed Project

Vehicle Type	ADT	Morning Peak Hour In	Morning Peak Hour Out	Evening Peak Hour In	Evening Peak Hour Out
Construction Personnel (plant site)[a]	432	206	11	11	206
Construction Personnel (Linear alignments)[a]	34	17	0	0	17
Delivery Trucks [b]	10	0	0	0	0
Heavy Vehicles and Trucks	30	0	0	0	0
Total	**506**	**223**	**11**	**11**	**223**

[a] Approximately 10 construction personnel trips (5 inbound and 5 outbound) associated with lunch and other business-related trips would occur from 9:00 a.m. to 4:00 p.m. (outside of peak hours)
[b] Delivery and other truck trips would occur on weekdays, from 9:00 a.m. to 4:00 p.m. (outside of peak hours)

During the peak construction period, using a average vehicle occupancy (AVO) factor of 1.14 persons per vehicle for commuting (National Personal Transportation Survey, Table 7.16, Average Vehicle Occupancy by Trip Purpose, FHWA, 1990), construction workers would generate an estimated 466 daily trips, 234 morning peak hour trips, and 234 evening peak hour trips. During this period, approximately 40 truck trips would occur (inbound and outbound trips for 5 delivery trucks to plant site, 8 heavy trucks to plant site, and 7 heavy trucks to pipeline construction areas), with no truck trips occurring during the a.m. and p.m. peak commute periods. Also, approximately 10 construction personnel trips (5 inbound and 5 outbound) associated with lunch and/or business-related trips would occur outside of the peak hours. Therefore, the total peak construction trip generation would be 506 daily trips, 234 morning peak hour trips, and 234 evening peak hour trips.

Trip Distribution. Trip distribution percentages for the construction employees are based on assumptions of regional demographics of construction workers, review of existing traffic counts from DPT, and recent surveys of the project site (i.e., drive-by windshield surveys). The construction worker trip distribution has been determined to be 25 percent within the City of San Francisco (local trips); 15 percent would originate in Marin County and points north; 40 percent would originate from the East Bay; and the remaining 20 percent would originate from San Mateo County and points south.

To arrive at the construction "laydown" area, adjacent to the project site, construction worker trips from Marin County would use U.S. 101 and exit on Cesar Chavez Street and proceed to Third Street. Trips from the East Bay would use I-80 to U.S. 101, and exit on Cesar Chavez Street. Trips from within the City would use 16th Street and Third Street to reach project location. Trips from San Mateo County would use I-280, exit at Evans Avenue and Third Street. The construction crew for the pipeline facilities (crew of eight workers) would be staged in appropriate areas along 23rd, Tennessee, Cesar Chavez, and Marin Streets, adjacent to pipeline construction activities.

Figure 8.10-6 illustrates the construction worker trip assignment that incorporates the trip generation and the distribution of construction workers. These volumes serve as the basis

for the traffic impact analyses to determine the LOS impacts likely to be imposed by construction of the proposed project.

Background Plus Project Conditions. As previously discussed, the proposed project would add approximately 234 morning and 234 evening peak hour trips to the study area street network in the 2007 construction year. To provide a worse case analysis, these peak hour trips were added to the 2007 baseline condition, and Figure 8.10-7 illustrates the 2007 plus project construction traffic a.m. and p.m. peak hour volumes, as well as the intersection geometrics and traffic controls. Table 8.10-6 summarizes the intersection LOS for the 2007 plus construction traffic condition.

TABLE 8.10-6
Level of Service Summary for 2007 Plus Project Construction Conditions

		Baseline (2007)		2007 Plus Project	
Intersection	Peak Hour	LOS	Delay*	LOS	Delay *
Third Street/16th Street	Morning	C	22.8	C	20.8
	Evening	B	16.5	B	19.3
Third Street/20th Street	Morning	A	2.2	A	2.4
	Evening	A	3.7	A	2.7
Third Street/23rd Street	Morning	A	2.9	A	4.1
	Evening	A	6.0	A	4.5
Third Street/25th Street	Morning	A	5.5	A	9.0
	Evening	B	11.0	B	14.8
Third Street/Cesar Chavez Street	Morning	D	40.8	D	53.1
	Evening	D	39.1	D	46.6
Third Street/Evans Avenue	Morning	D	44.1	D	49.3
	Evening	C	33.5	D	43.9
Evans Avenue/Cesar Chavez Street	Morning	B	14.1	B	16.9
	Evening	C	29.9	C	26.4

Note:
* Delay in seconds per vehicle

Based on the traffic analysis, addition of the construction worker traffic volumes would change LOS during one or both peak hours at the following intersections:

- Third Street/Evans Avenue: LOS C to LOS D in the evening peak hour

Although the construction trips associated with the project would change LOS at this intersection, all study area intersections are forecast to continue to operate at LOS D or better. Based on the freeway mainline analysis prepared for the 2007 plus peak construction phase of the project, mainline LOS at the study area segments of I-280, Highway 101, and I-80 would remain the same as the 2007 baseline (i.e., without project) condition. Project contributions to the LOS F segments of Highway 101 and I-80 would be less than one percent and two percent,

respectively. The project contribution of two percent or less to the freeway mainline segments would be considered less-than-significant.

Therefore, the addition of project construction traffic would have a less-than-significant impact on intersection levels of service in the study area. In addition, it is important to note that this peak construction activity would only occur for a 4-month period.

Construction impacts related to the WPS and process water supply pipeline component are primarily related to the placement pipeline and associated materials along streets in the study area. A crew of 8 pipeline construction personnel and 11 transmission line workers would be working during the peak month. These crews would park adjacent to their worksites, rather than the laydown area on 25th Street. The construction methods for the pipeline would consist of open-cut trenching and tunneling methods such as microtunneling or jack-and-bore along the following roadway segments:

- Marin Street, west of I-280 to Cesar Chavez Street
- Cesar Chavez Street to the point where it turns north into the project site

Similarly, construction of the transmission line would be by open trench or microtunnel, where needed.

The project will prepare a Traffic Management Plan (TMP) to offset traffic impacts associated with construction of the pipeline and transmission line. The 17 morning peak hour, and 17 evening peak hour trips (using 1.14 AVO for 19 workers along these linears) would not have a measurable impact on the streets in the study area.

The roadways providing access to the project site and plant and linear laydown areas would continue to provide adequate capacity to accommodate the additional vehicle trips expected during construction. A TMP will also address the potential impacts to affected streets due to the installation of the WPS and process water supply pipeline. Therefore, impacts during construction are expected to be less-than-significant.

8.10.3.2.2 Operational Impacts. The permanent addition of 11 employees and other plant-associated trips (i.e., materials deliveries, visitors, business-related trips) for operations would generate 82 daily, 11 morning peak hour, and 11 evening peak hour trips. Once these trips are distributed on the study area network, they would result in a less-than-significant impact, as their traffic volumes would be immeasurable in terms of intersection LOS. The freeway mainline LOS analysis for the 2015 cumulative condition indicated that Highway 101 and I-80 would continue to operate at LOS F, while I-280 would operate at LOS D.

The remaining 60 non-peak hour trips would be associated with regular plant deliveries, visitors, and employee business-related trips. Since these trips would be spread throughout the day, and would not occur during the peak commute hours, they would also have a less-than-significant impact on traffic operations.

8.10.3.3 Parking Facilities

Construction of the proposed project would not impact on-street parking. A vacant lot to the east of the project site will be used as a laydown area (staging, and construction worker parking lot) for the construction worker parking demand (see Figure 8.10-2).

When completed, the project would contain adequate onsite parking to accommodate the permanent 11 employees. In addition, street parking will continue to be available along 25th Street. Street parking spaces would not be eliminated as part of the proposed project. Therefore, no significant impacts to parking are anticipated.

8.10.3.4 Public Transportation

MUNI Route 48 has a stop at Illinois Street/22nd Street, which is the nearest stop to the project site. (Once the light rail on Third Street is completed, it may have a closer stop.) Approximately 23 percent (61 employees) of the construction workforce is anticipated to either carpool or use alternative transportation modes to and from the project site, and the remaining 203 employees would drive their automobiles to the laydown area. A portion of the 61 construction workers and a portion of the 11 permanent employees would not significantly impact the operations of MUNI bus routes, and the future Third Street Light Rail Line (for permanent employees).

8.10.3.5 Bicycle and Pedestrian Circulation

By the end of 2005, planned bicycle routes on Third Street, Cesar Chavez Street, and Illinois Street will be completed. Pedestrian sidewalks will continue to exist along on Third Street, while Illinois Street, 23rd Street, and 25th Street will offer little space to accommodate pedestrians. Construction-related traffic would be temporary in nature and would circulate during the a.m. and p.m. peak hours only, while operational traffic of the project would be relatively low. The addition of construction and operational traffic is not expected to significantly impact pedestrian or bicycle facilities along Third Street, Cesar Chavez Street, and Illinois Street.

8.10.3.6 Goods Movement

Construction and operation of the proposed project would not impact adjacent freight rail lines, and air or shipping routes. Therefore, the project would not have a significant impact on goods movement.

8.10.3.7 Safety

There will be no changes to the design of the roadways in the vicinity of the proposed project site. Accident rates at nearby intersections are relatively low, averaging approximately 2.5 per year (Korve Engineering, 1999). Truck traffic within the area would continue to use designated truck routes (Cesar Chavez Street) to access the proposed project site. In addition, the project site is located in an industrial zone one block east of Third Street, with no neighboring commercial retail businesses or residences. Impacts to vehicle, pedestrian, and bicycle safety as a result of construction and operation of the project would be less-than-significant.

8.10.3.8 Air, Rail, and Waterborne Traffic

The proposed project would have no impacts on air, rail, or waterborne traffic.

8.10.3.9 Hazardous Materials Transport

Construction of the proposed project would generate hazardous wastes consisting primarily of batteries, asbestos containing materials, and various liquid wastes (e.g., cleaning

solutions, solvents, paint and antifreeze). Contaminated soils could also be generated in the pre-construction or site preparation phase and would be transported as hazardous materials or hazardous waste. (See Subsection 8.13.6.1.2.) Transport route arrangements would be required with Caltrans officials for permitting and escort, as applicable. Generally, only small quantities of hazardous materials will be used during the construction period, as described in Subsection 8.12, Hazardous Materials Handling. They may include gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. Because of the small quantities of hazardous materials involved, shipments will likely be consolidated. Multiple truck deliveries of hazardous materials during construction are unlikely. During construction, a minimal number of truck trips per month will be required to haul waste for disposal. Because the transport of hazardous wastes will be conducted in accordance with the relevant transportation regulations (see below), no significant impact is expected.

Operation of the project would result in the generation of additional wastes including lubricants, water treatment chemicals, herbicides and pesticides, and sludge. In addition, operation of the project will require transportation of aqueous ammonia, a regulated substance. Aqueous ammonia will be delivered to the plant by truck transport using designated truck routes (see discussion below). Small quantities of sulfuric acid and various other hazardous materials will also be used in project operations, as described in Subsection 8.12. According to Division 13 Section 31303 of the CVC, the transportation of regulated substances and hazardous materials will be on the state or interstate highways that offer the shortest overall transit time possible.

Aqueous ammonia is considered a potential inhalation hazard. Division 14.3 Section 32105 of the CVC specifies that unless there is not an alternative route, every driver of a vehicle transporting inhalation hazards shall avoid, by prearrangement of routes, driving into or through heavily populated areas, congested thoroughfares, or places where crowds are assembled.

The truck loading area will be located within a bermed area adjacent to the storage tank onsite. The use of 29 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year, or 28 truck trips per year. This would equate to approximately 1 to 2 deliveries per month, or 2 to 4 truck trips per month (inbound and outbound). These occasional truck trips would generally occur during the non-peak commute hours. If the plant uses lower concentrations of aqueous ammonia, more frequent delivery would be required.

Table 8.10-7 summarizes expected truck trips for the project, including delivery of hazardous materials and removal of wastes. There will be a maximum of ten truck trips per day, with an average of 2 or less truck trips per day to the project site. For further information on the management of hazardous materials and waste products, see Subsections 8.12 and 8.13, respectively.

TABLE 8.10-7
Estimated Truck Traffic at the Facility During Operation

Delivery Type	Number and Occurrence of Trucks
Aqueous ammonia	1 to 2 per month
Sulfuric acid	2 per month
Cleaning chemicals	1 per month
Trash pickup	1 per week
Lubricating oil	4 per year
Lubricating oil filters	4 per year
Laboratory analysis waste	4 per year
Oily rags	4 per year
Oil absorbents	4 per year
Water treatment chemicals	Up to 4 per week

Additionally, transporters of inhalation hazardous or explosive materials must contact the CHP and apply for a Hazardous Material Transportation License. Upon receiving this license, the shipper will obtain a handbook that will specify the routes approved to ship inhalation hazardous or explosive materials. The exact route of the inhalation or explosive material shipment will not be determined until the shipper contacts the CHP and applies for a license. Transportation impacts related to hazardous materials associated with power plant operations will not be significant since deliveries of hazardous materials will be limited. Delivery of these materials will occur over prearranged routes and will be in compliance with all LORS governing the safe transportation of hazardous materials.

Standards for the transport of hazardous materials are contained in the Code of Federal Regulations, Title 49 and enforced by the U.S. Department of Transportation. Additionally, the State of California has promulgated rules for hazardous waste transport that can be found in the California Code of Regulations, Title 26. Additional regulations for the transportation of hazardous materials are outlined in the California Vehicle Code (Sections 2500-505, 12804-804.5, 31300, 3400, and 34500-501). The two state agencies with primary responsibility for enforcing federal and state regulations governing the transportation of hazardous wastes are the California Highway Patrol (CHP) and Caltrans. Transport of hazardous materials to and from the SFERP will comply with all applicable requirements.

For those materials that require offsite removal, a licensed hazardous waste transporter would move these substances to one of three Class I hazardous waste landfills in proximity to the project site. Access by waste haulers to the project site would be via 25th Street. Vehicles can then proceed south along Illinois Street to Cesar Chavez Street to reach southbound I-280 to U.S. 101 (hazardous wastes cannot be transported on the Bay Bridge (I-80)). Specific outbound truck routes in the City from the project site to southbound I-280 to U.S. 101 are as follows:

1. Project site (25th Street) to Third Street – southbound
2. Third Street to Cesar Chavez Street – westbound

3. Cesar Chavez Street to Pennsylvania Avenue – northbound
4. Pennsylvania Avenue to I-280 southbound on-ramp
5. I-280 southbound to U.S. 101 southbound

Specific inbound truck routes in the City to the project site from northbound 1-280 from U.S. 101 are as follows:

1. U.S. 101 northbound to I-280 northbound
2. I-280 northbound to Evans Avenue/Cesar Chavez Street off-ramp
3. Evans Avenue – eastbound, to Third Street
4. Third Street – northbound, to project site (25th Street)

These inbound and outbound truck routes serving the project site to I-280/U.S. 101 would travel through predominantly industrial areas within the City. Once established, these routes would not allow truck travel through sensitive residential neighborhood areas.

For outbound trucks, once on U.S. 101, trucks would proceed around the south end of the Bay to I-580 and I-5 via I-880 and SR 238. Alternatively, haulers could continue through Stockton to State Route 99 (SR 99) that parallels I-5 but runs slightly east through the Central Valley communities of Merced and Fresno. I-5 and SR 99 provide access to California's three Class I hazardous waste facilities including:

- Safety Kleen, Buttonwillow (Kern County)
- Safety Kleen, Imperial County
- Chemical Waste Management, Kettleman Hills (Kings County)

The major highways and interstates that would be used to carry hazardous wastes from the project site to the appropriate landfills contain adequate capacity to accommodate these vehicle trips. Hauling would be carried out in accordance with local, state, and federal regulations that include the Resource Conservation and Recovery Act (42 U.S. Code 6901 et seq.), the California Integrated Waste Management Act (Public Resources Code Sections 40000 et seq.), and the San Francisco Department of Public Health.

In addition, the federal government prescribes regulations for transporting hazardous materials. These regulations are described in the Code of Federal Regulations, Number 49, Part 171. These laws and ordinances place requirements on various aspects of hazardous waste hauling, from materials handling to vehicle signs, to ensure public safety. Transporting and handling of chemicals and wastes are discussed in Subsection 8.12, Hazardous Materials Handling, including the transport of ammonia.

8.10.4 Cumulative Impacts

As described previously, the available capacity of the regional state routes and local roads in the project area shows the regional and local transportation system has the capacity to accommodate future traffic including that resulting from the proposed construction and operation of project.

According to MUNI, the Third Street LRT project is anticipated to be completed and in operation by the end of 2005. Based on discussions with MUNI staff (Garcia, 2005), Segment B of the LRT extension (16th Street to 23rd Street) would be completed and in operation by September 2005, while Segment C (23rd Street to Cesar Chavez Street) would be completed

and in operation by late 2005. The remaining segments (south to the City limits) would be completed an in operation by the end of 2005. Segment C is the closest to the project site. Construction of the proposed project in 2006 (with peak construction months 5 through 8), would occur after completion of Segment C of the LRT project. Since Segment C would be completed before the peak construction months of the proposed project, it is anticipated that there would be no significant construction timing issues relating to peak hour trips of construction forces and truck trips.

Construction on the proposed MUNI Maintenance and Operations Facility (located between the project site and Illinois Street) is expected to begin in June 2005, and be completed by March 2008. It is anticipated that the average construction workforce will be 120 workers, with a peak construction workforce of 200 workers. The peak workforce would occur in approximately October, 2006 (Fong, 2005). With a conservative assumption of four months of peak work force (September to December, 2006), there will be an overlap of peak workforces in December 2006. The combined peak will be 464 workers.

To assess the cumulative impacts of the two projects, the analysis of intersection level of service (described in Subsection 8.10.3.2) was supplemented with a cumulative analysis of the two projects. The total number of trips (Table 8.10-5) was increased to reflect the additional 200 workers associated with the construction of the MUNI Maintenance and Operations Facility. Trip distribution was completed using the same procedures described in Subsection 8.10.3.2.1

Table 8.10-8 summarizes the intersection LOS for the 2007 plus construction traffic condition (with and without the cumulative analysis). The right columns list the LOS and delay for the overlapping peak construction period for both projects.

TABLE 8.10-8
Level of Service Summary for 2007 Plus Project Construction Conditions

Intersection	Peak Hour	Baseline (2007)		2007 Plus Project		2007 Cumulative	
		LOS	Delay*	LOS	Delay *	LOS	Delay *
Third Street/16th Street	Morning	C	22.8	C	20.8	C	26.0
	Evening	B	16.5	B	19.3	C	21.3
Third Street/20th Street	Morning	A	2.2	A	2.4	A	2.4
	Evening	A	3.7	A	2.7	A	2.8
Third Street/23rd Street	Morning	A	2.9	A	4.1	A	3.7
	Evening	A	6.0	A	4.5	A	5.5
Third Street/25th Street	Morning	A	5.5	A	9.0	A	9.1
	Evening	B	11.0	B	14.8	C	33.0
Third Street/Cesar Chavez Street	Morning	D	40.8	D	53.1	E	63.5
	Evening	D	39.1	D	46.6	D	47.9
Third Street/Evans Avenue	Morning	D	44.1	D	49.3	E	57.7
	Evening	C	33.5	D	43.9	D	43.9
Evans Avenue/Cesar Chavez Street	Morning	B	14.1	B	16.9	C	20.9
	Evening	C	29.9	C	26.4	C	25.9

Note:
* Delay in seconds per vehicle

In most cases, the increase in delay is minimal, because traffic will be added to major movements that operate a good LOS (with spare capacity). However, the results indicate degradation of operations to LOS E in the morning peak for the intersections of Third Street/Cesar Chavez Street and Third Street/Evans Avenue. While the increases are relatively minor (8 to 10 seconds per intersection), they do result in degradation to LOS E. These operations will be a significant cumulative impact of the two projects.

The Southern Waterfront SEIR identifies a number of mitigation measures for traffic operations impacts associated with the proposed Port projects in the vicinity of the SFERP. These mitigation measures include new traffic signals, additional turn lanes, and modifications to intersection channelization. The mitigation measures are proposed to be instituted as needed as LOS degrades (San Francisco Planning Department, 2001). However, the Southern Waterfront analysis considers traffic operations in 2015, well after the construction of the proposed project. Therefore, the mitigation measures associated with the Southern Waterfront SEIR are not applicable to the construction traffic impacts that are expected with the SFERP.

8.10.5 Mitigation Measures

8.10.5.1 Construction Impacts

Construction of proposed project would add a moderate amount of traffic to state routes and local roadways during the peak construction period. However, because existing intersection capacity is adequate, these project-related traffic increases will not result in significant impacts.

During operation and construction, access to the facility will be provided via Third Street to 25th street. The construction contractor will prepare a construction traffic control plan and construction management plan, also known as a Traffic Management Plan (TMP), that addresses timing of heavy equipment and building material deliveries, potential street and/or lane closures associated with pipeline installation, signing, lighting, traffic control device placement, and establishing work hours outside of peak traffic periods.

Methods for mitigating potential traffic impacts caused by construction may include such activities as stationing flag persons at the access road into the site, and placing advance warning flashes, flag persons, and signage along the roadways. Figures 8.10-8 and 8.10-9 illustrate traffic control systems, as developed by Caltrans, that would be implemented during the construction phases of the project. Damage to any roadway opened during construction will be restored to or near its preexisting condition. The construction contractor will work with the local agency's engineer to prepare a schedule and mitigation plan for the roadways along the construction routes.

It should be noted that most trip reduction strategies are not feasible for the construction phase of the project, primarily because of the differing schedules of tradespersons and the need to transport tools and materials to the job site.

8.10.5.2 Operation Impacts

The operations-related and maintenance-related traffic associated with the project is considered to be minimal; state routes and local roadways have adequate capacity to

accommodate operations-related traffic. Consequently, no operations-related mitigation measures are required.

8.10.5.3 Cumulative Impacts

Mitigation measures will be needed to address the cumulative impacts of the proposed project and the construction of the MUNI Maintenance and Operations facility. Depending on the exact timing of the construction activities, there may be opportunities to stagger the start and end times of each shift so that all of the workers for the two projects are not arriving or departing at the same time. The TMP should also address coordination issues between the two projects to minimize construction-related impacts.

8.10.6 Involved Agencies and Agency Contacts

The proposed project lies in proximity to roadways operated by the City of San Francisco. The relevant agencies and appropriate contacts are shown in Table 8.10-9.

TABLE 8.10-9
Agency Contacts

Agency	Contact/Title	Telephone
San Francisco, Planning Department	Tim Blomgren Environmental Group 30 Van Ness Avenue, 4th Floor San Francisco, CA 94102	(415) 558-5979
San Francisco County Transportation Authority	Tilly Chang Manager of Planning 100 Van Ness Avenue, 25th Floor San Francisco, CA 94102	(415) 522-4832
San Francisco, Department of Parking and Traffic	Jerry Robbins 25 Van Ness Avenue, Suite 410 San Francisco, CA 94102	(415) 554-2343
Federal Motor Carrier Safety Administration	Bob Brown Materials Specialist 201 Mission Street, Suite 2100 San Francisco, CA 94105	(415) 744-2646

8.10.7 Permits Required and Permit Schedule

Traffic studies for projects in San Francisco require consultation with the City Planning Department to comply with its extensive traffic analysis requirements. The short duration of the construction, in conjunction with the minute permanent addition of 100 trips, impose a relatively insignificant addition to existing traffic levels. The City will consult with Planning Department staff to determine the extent to which the traffic analysis requirements should be applied in the case of the SFERP.

The relevant permits required for work performed within city streets in San Francisco are identified in Table 8.10-10.

TABLE 8.10-10
Required Permits

Responsible Agency	Permit/Approval	Schedule
CCSF, Department of Public Works – Bureau of Street-Use and Mapping	Utility Permit	45-60 days
CCSF, Department of Parking and Traffic – Bureau of Traffic Engineering	Extralegal Truck Permit (if necessary)	24 hours

8.10.8 References

Arellano, Dan. 2004. City of San Francisco Department of Parking and Traffic, E-mail transmission on Third Street Light Rail Transit Project. January.

California Resources Agency. 1999. CEQA: The California Environmental Quality Act - *Statutes and Guidelines.* Amended March 29.

City and County of San Francisco Department of Parking and Traffic (DPT). 1997. *Regulations for Working in San Francisco Streets.* Fifth Edition. October.

City and County of San Francisco, Planning Department. 1995. *San* Francisco General *Plan, Transportation Element.* Adopted June 1995, revised 2002.

City and County of San Francisco, Planning Department. 1998. *Environmental Impact Statement for the Third Street Light Rail Project in the City* and *County* of San Francisco. April.

City and County of San Francisco, Department of Public Works. 1999. Regulations *for Excavating and Restoring Streets in* San Francisco. Order No. 171,442, Approved January.

Fleck, Jack. 2003. City of San Francisco Department of Parking and Traffic. E-mail transmission on existing and future traffic counts. December.

Fong, John. 2005. Project Manager of the MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility. Personal communication with John Carrier. March 9.

Garcia, Velmo. 2005. Public relations for MUNI Third Street Light Rail Project. Personal conversation with Mohammad Amin. February.

Howard, Drew. 2004. MUNI Third Street Light Rail Project. Personal conversation with Dennis Pascua. February.

Korve Engineering, Inc. 1993-1999. Traffic Counts.

Metropolitan Transportation Commission (MTC). 2001. Travel Forecasts for the San Francisco Bay Area 1998-2025.

Metropolitan Transportation Commission (MTC). 2004. Model.

San Francisco Planning Department. 2001. San Francisco Southern Waterfront: Final Supplemental Environmental Impact Report.

State of California, Department of Transportation. 1992. *Standard Plans.* June.

State of California, Department of Transportation. 1996. *Traffic Manual,* Chapter 5, Manual of Traffic Controls for Construction and Maintenance Work Zones.

State of California, Department of Transportation, District 4. 1998. Traffic *and Vehicle* Systems Data Unit, (website: http:llwww.dot.ca.govlhq/traffops/saferesr/trafdata/index.htm)

State of California, Department of Transportation, District 4. 2003. Traffic *Volumes on California State Highways.*

Tannen, Peter. 2003. City of San Francisco Department of Parking and Traffic. E-mail transmission on planned bicycle routes. December.

Transportation Research Board (TRB). 2000. *Highway Capacity Manual,* Special Report 209.

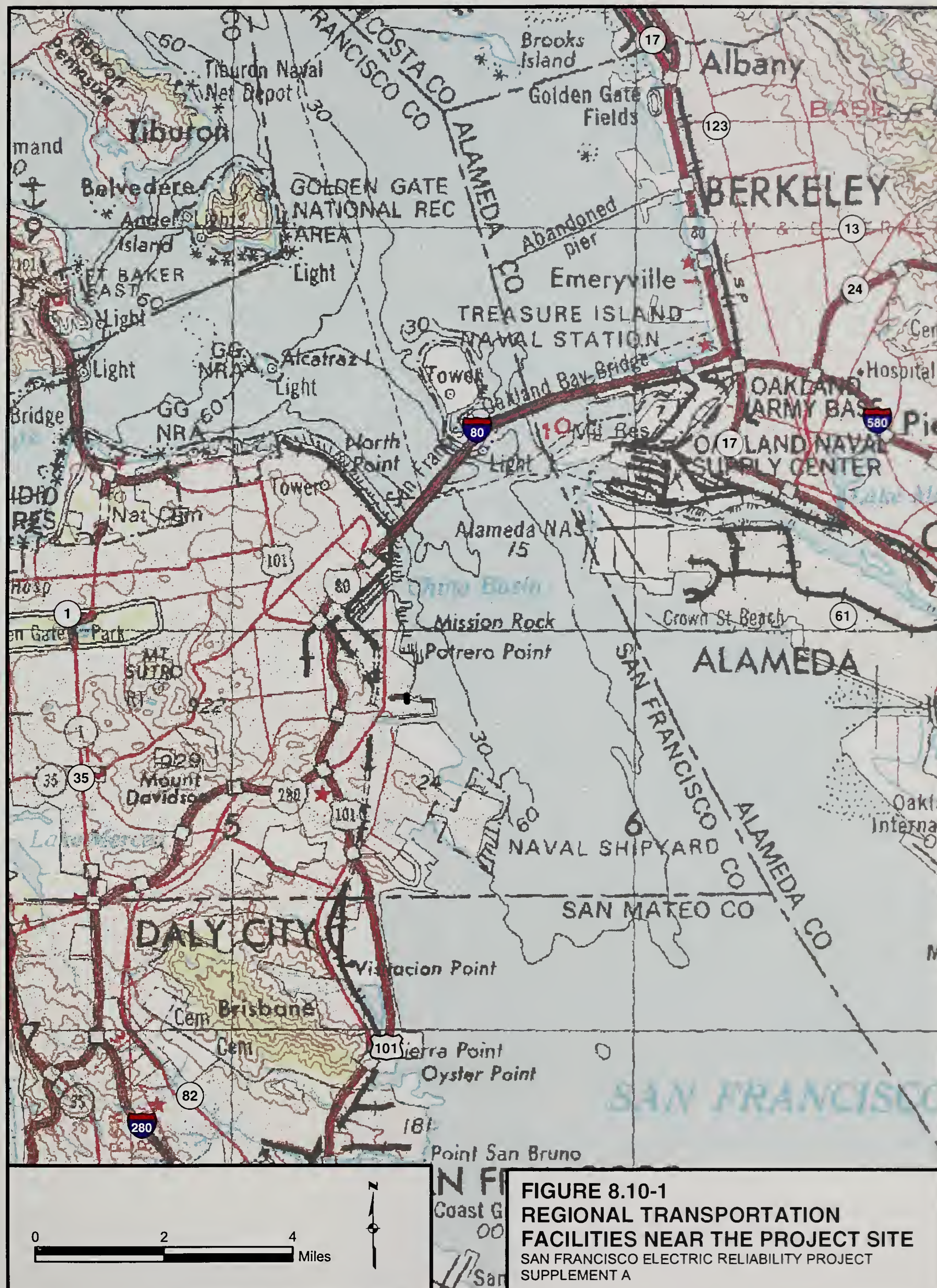


FIGURE 8.10-1
REGIONAL TRANSPORTATION FACILITIES NEAR THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

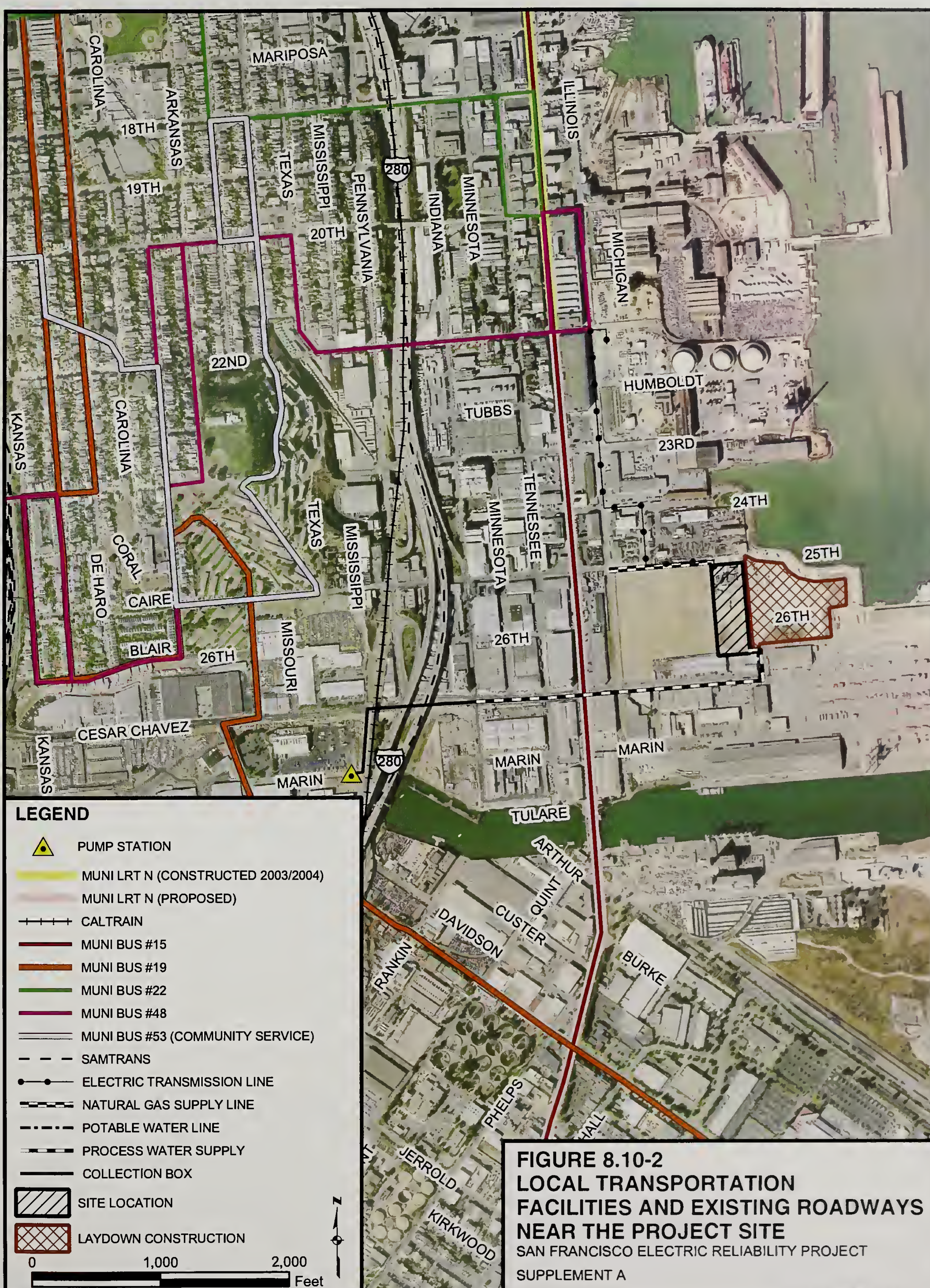


FIGURE 8.10-2
LOCAL TRANSPORTATION FACILITIES AND EXISTING ROADWAYS NEAR THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

RDD \\RDD40004508\RDDGIS\SFPUC\MXDS\8_10-2_TRAFFIC_SUPPLEMENTA.MXD 3/1/2005 14:52:17

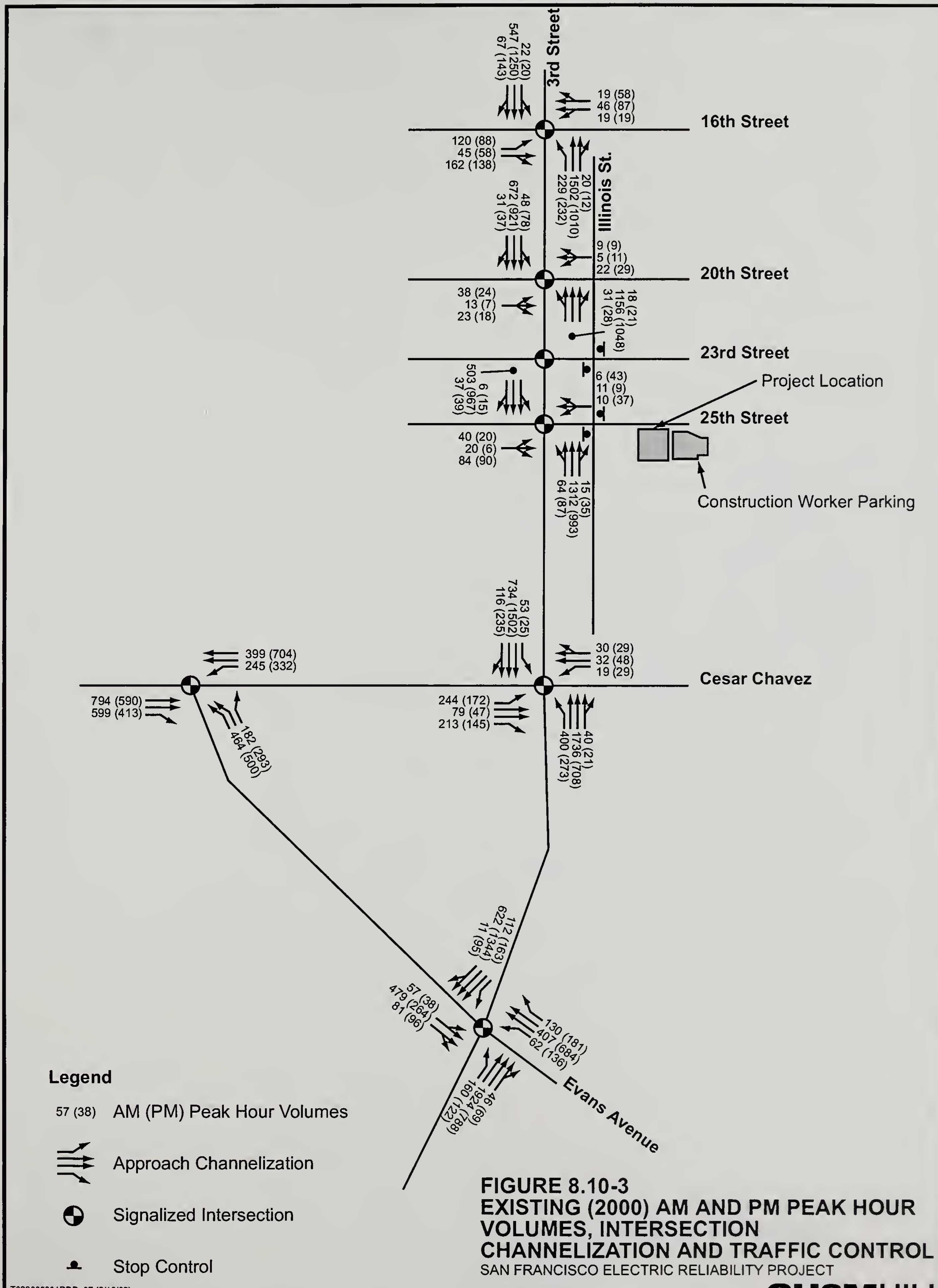
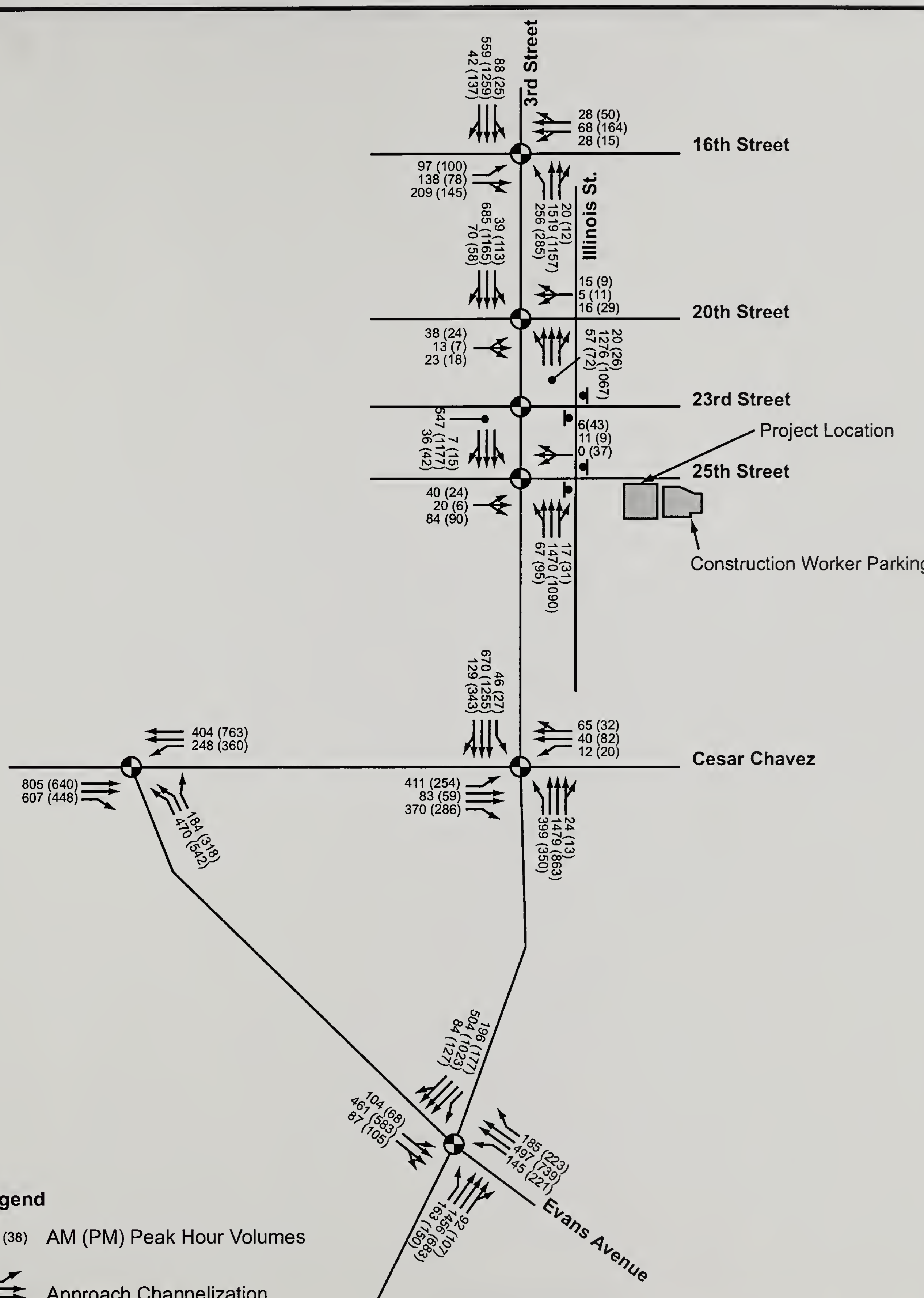


FIGURE 8.10-3
EXISTING (2000) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL



Legend

57 (38) AM (PM) Peak Hour Volumes

Approach Channelization

Signalized Intersection

Stop Control

T022005001RDD_03 (2/8/05)

FIGURE 8.10-4
BACKGROUND (2007) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPLEMENT A

CH2MHILL

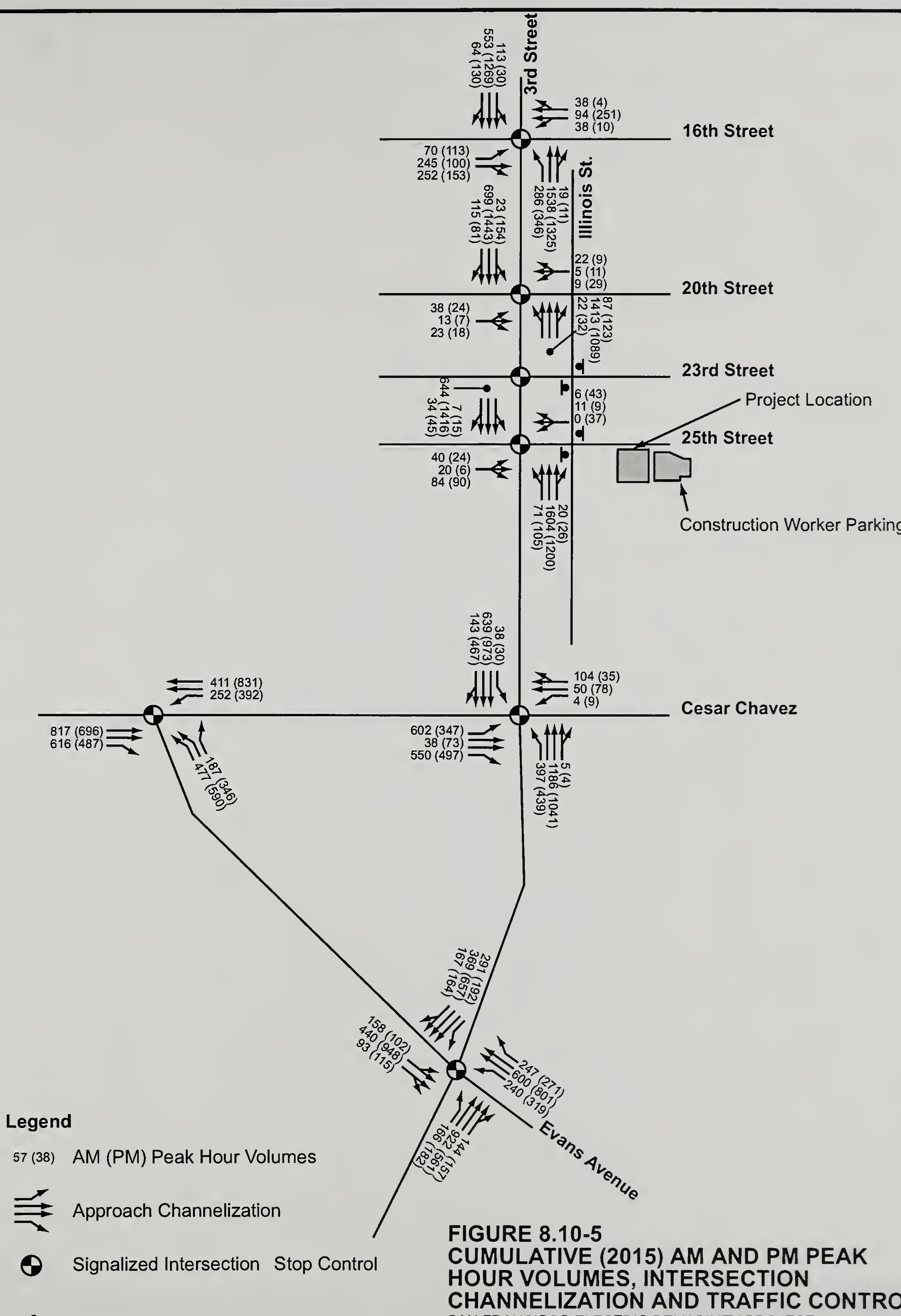


FIGURE 8.10-5
CUMULATIVE (2015) AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

T022005001RDD_06 (2/16/05)

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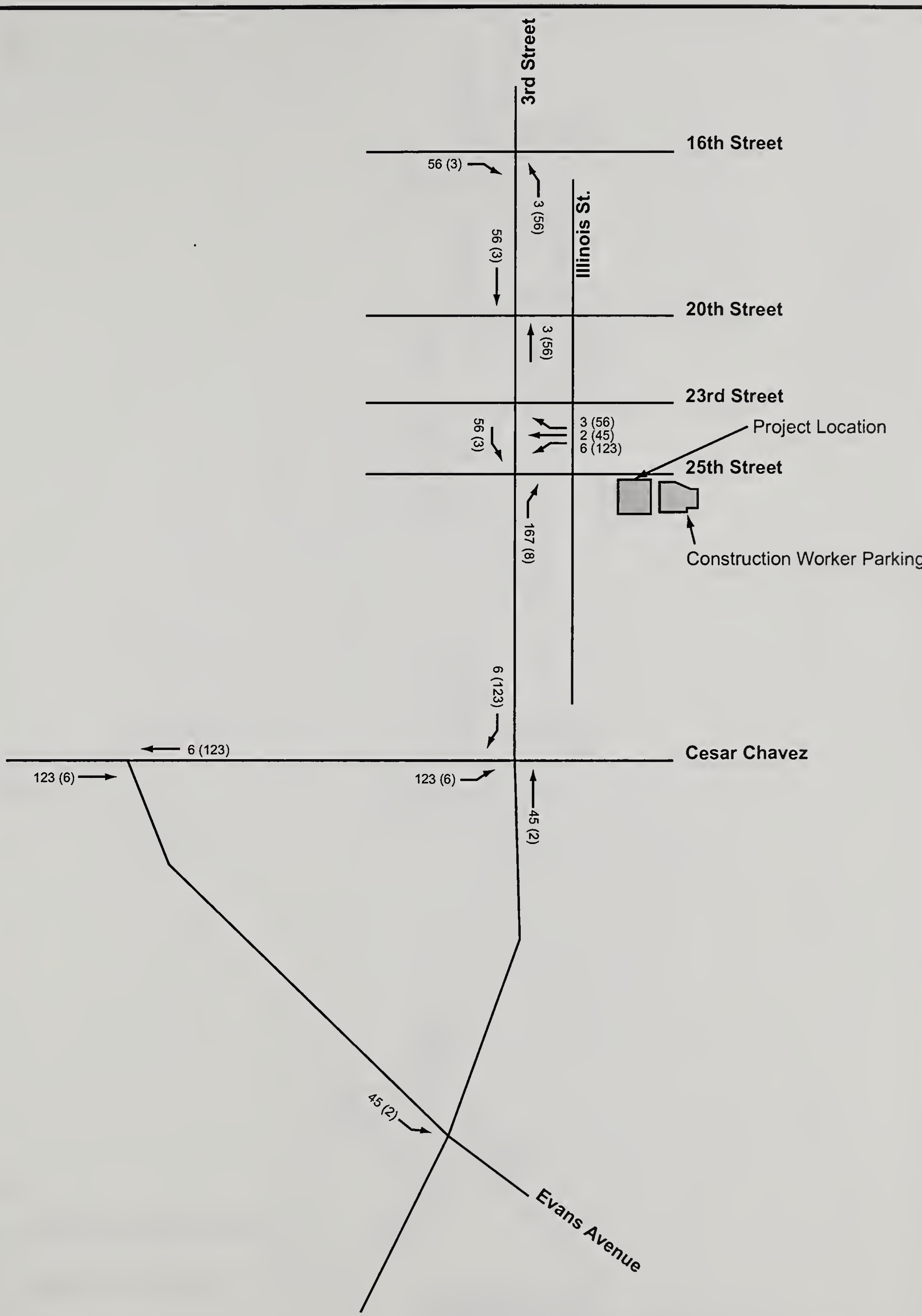

Legend

57 (38) AM (PM) Peak Hour Turn Volumes

FIGURE 8.10-6
PROJECT CONSTRUCTION WORKER AM AND PM PEAK HOUR VOLUMES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPLEMENT A

CH2MHILL

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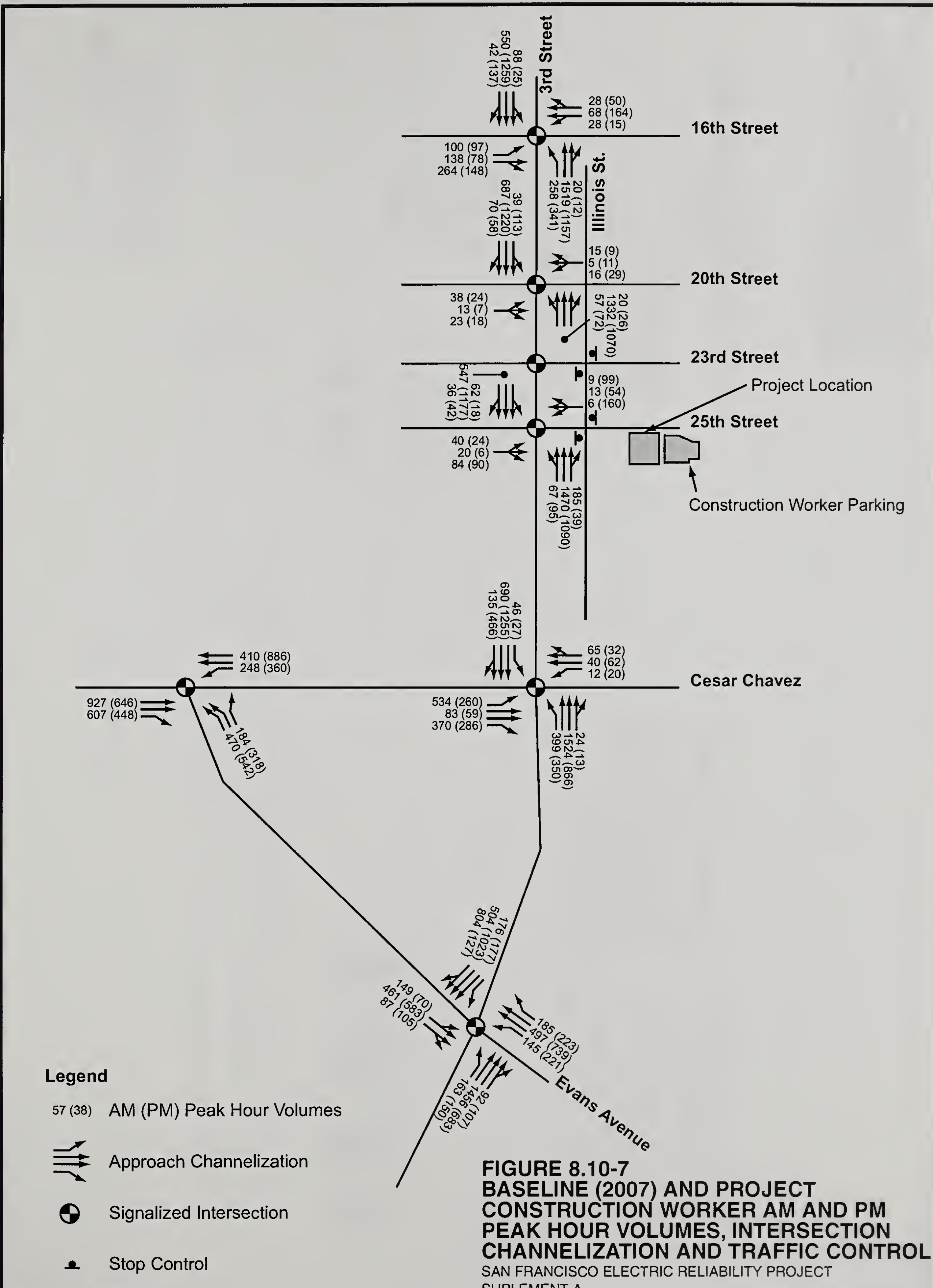
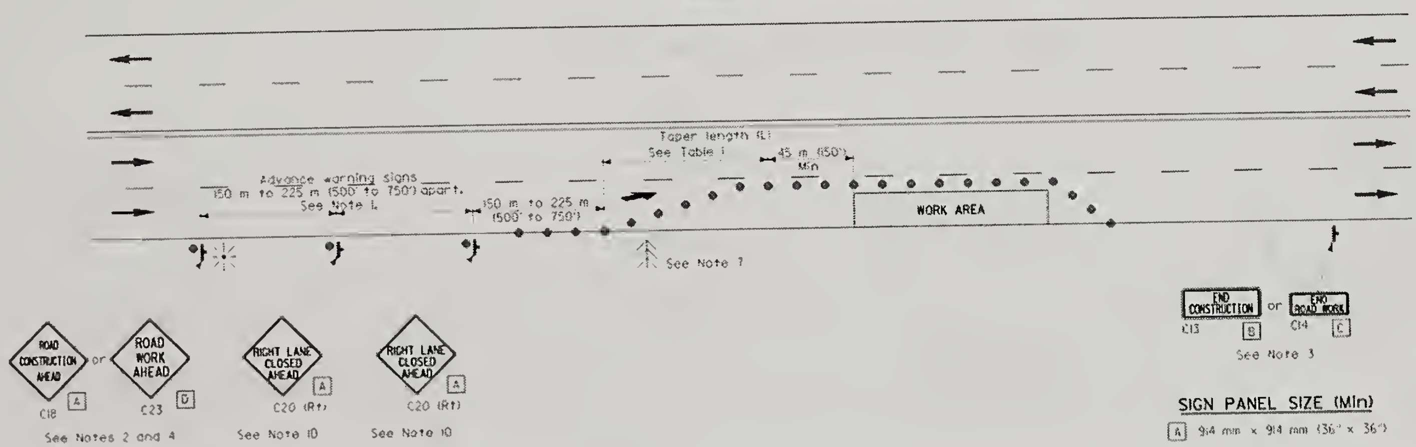


FIGURE 8.10-7
BASELINE (2007) AND PROJECT CONSTRUCTION WORKER AM AND PM PEAK HOUR VOLUMES, INTERSECTION CHANNELIZATION AND TRAFFIC CONTROL
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPLEMENT A

July 1, 2002

Greg A. Edwards C36386 6-30-04

TYPICAL LANE CLOSURE



SIGN PANEL SIZE (Min)

- A 914 mm x 914 mm (36" x 36")
- B 1219 mm x 457 mm (48" x 18")
- C 914 mm x 457 mm (36" x 18")
- D 762 mm x 762 mm (30" x 30")

LEGEND

- Traffic Cone
- Portable Sign
- Direction of Travel
- Flashing Arrow Sign
- Portable Flashing Beacon

TABLE I

Approach Speed	Taper Length (L) *	Number of Cones for Taper *	Spacing of Cones Along Taper
0-40 km/h 10-25 mph	38 m (125')	6	7.5 m (25') ±
40-65 km/h (25-40 mph)	98 m (320')	9	12 m (40') ±
65-80 km/h (40-50 mph)	183 m (600')	13	15 m (50') ±
Over 80 km/h (50 mph)	See Note 9		

* Based on 3.6 (12') wide lane. This column is also appropriate for lane widths less than 3.6 m (12')

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI) or "metric" and United States Standard Measures shown in the parentheses ( ). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" of the beginning of this publication.

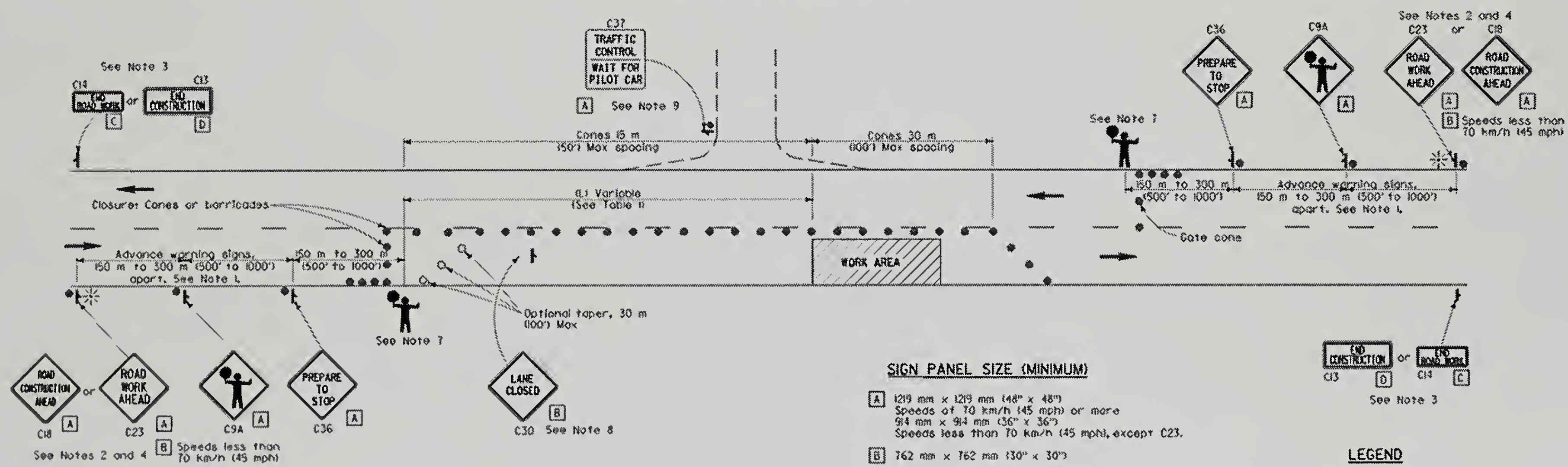
NO SCALE

NOTES:

1. Where approach speeds are low, signs may be placed at 90 m (300') spacing, and in urban areas, closer.
2. All advance warning sign installations shall be equipped with flags for daytime closures. Flashing Beacons shall be placed at the locations indicated for nighttime closures.
3. A C13 "END CONSTRUCTION" or C14 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane closure unless the end of work area is obvious, or ends within a larger project's limits.
4. If the C18 (or C23) sign would follow within 600 m (2000') of a stationary L18, C23, or C11 STATE HIGHWAY CONSTRUCTION NEXT ____ MILES", use a C20 sign for the first advance warning sign.
5. All cones used for night lane closures shall be fitted with reflective sleeves as specified in the specifications.
6. Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used in lieu of cones for daytime closures only.
7. Flashing arrow sign shall be either Type I or Type II.
8. The maximum spacing between cones in a taper shall be approximately as shown in Table I and 15 m (50') maximum spacing on tangent.
9. For approach speeds over 80 km/h (50 mph), use the "Traffic Control System for Lane Closure On Freeways and Expressways" plan for lane closure details and requirements.
10. Where specified in the special provisions, a W4 "LANE REDUCTION SYMBOL" sign is to be used in place of the C20 "RIGHT LANE CLOSED AHEAD" sign.

FIGURE 8.10-8
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON MULTILANE CONVENTIONAL HIGHWAYS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

TYPICAL LANE CLOSURE WITH REVERSIBLE CONTROL



SIGN PANEL SIZE (MINIMUM)

- A: 1219 mm x 1219 mm (48" x 48") Speeds of 70 km/h (45 mph) or more; 914 mm x 914 mm (36" x 36") Speeds less than 70 km/h (45 mph), except C23.
- B: 762 mm x 762 mm (30" x 30")
- C: 914 mm x 457 mm (36" x 18")
- D: 1219 mm x 457 mm (48" x 18")

TABLE I

Approach Speed	* (L)
0-50 km/h (0-30 mph)	60 m (200')±
50-70 km/h (30-45 mph)	90 m (310')±
over 70 km/h (45 mph)	150 m (500')±

* Increase by 20 percent on sustained downgrades steeper than 3 percent and longer than 1.6 km (one mile).

LEGEND

- ● Traffic Cone
- ○ Traffic Cone (Optional Taper)
- Portable Sign
- Direction of Travel
- Portable Flashing Beacon
- Flagger

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

These "Standard Plans for Construction of Local Streets and Roads" contain units in two systems of measurement: International System of Units (SI or "metric") and United States Standard Measures shown in the parentheses (). The measurements expressed in the two systems are not necessarily equal or interchangeable. See the "Foreword" at the beginning of this publication.

NO SCALE

NOTES

1. Where approach speeds are low, signs may be placed at 90 m (300') spacing and in urban areas, closer.
2. All advance warning sign installations shall be equipped with flags for daytime closures. Flashing beacons shall be placed at the locations indicated during night lane closures.
3. A C13 "END CONSTRUCTION" or C14 "END ROAD WORK" sign, as appropriate, shall be placed at the end of the lane control unless the end of work area is obvious, or ends within a larger project's limits.
4. If the C18 (or C23) sign would follow within 600 m (2000') of a stationary C18, C23, or C11 "STATE HIGHWAY CONSTRUCTION NEXT ______ MILES", use a C9A sign for the first advance warning sign.
5. All cones used for night lane closures shall be fitted with reflective sleeves as specified in the specifications.
6. Portable delineators, placed at one-half the spacing indicated for traffic cones, may be used in lieu of cones for daytime closures only.
7. Additional advance flaggers may be required. Flagger should stand in a conspicuous place, be visible to approaching traffic as well as approaching vehicles after the first vehicle has stopped. Nighttime flagger station shall be illuminated as provided in the current edition of the "Manual of Traffic Controls" published by the State of California, Department of Transportation. Place a minimum of four cones at 15 m (50') intervals in advance of flagger station as shown.
8. Place C30 "LANE CLOSED" sign at 150 to 300 m (500' to 1000') intervals throughout extended work areas. They are optional if the work area is visible from the flagger station.
9. When a pilot car is used, place a C37 "TRAFFIC CONTROL-WAIT FOR PILOT CAR" sign at all intersections within traffic control area. Signs shall be clean and visible at all times.

July 1, 2002

FIGURE 8.10-9
TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE ON TWO LANE CONVENTIONAL HIGHWAYS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

T022005001RDD_31 (3/8/05)

SUBSECTION 8.11

Visual Resources

8.11 Visual Resources

8.11.1 Introduction

Visual resources are the natural and cultural features of the landscape that can be seen and that contribute to the public's appreciative enjoyment of the environment. Visual resources impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project's presence will change the perceived visual character and quality of the environment in which it will be located.

This section discusses the potential for the construction, operation, and maintenance of the proposed project to cause significant impacts to visual resources in the project vicinity.

This section was prepared following the California Energy Commission (CEC) guidelines for preparing visual impact assessments for Applications for Certification (AFCs). Subsection 8.11.2 documents the visual conditions that now exist in the project area. Subsection 8.11.3 describes the changes to the project area's landscape from project implementation. Subsection 8.11.4 discusses the significance of the potential impacts of the project. Subsection 8.11.5 discusses the potential cumulative impacts of this and other projects on the visual resources in the area. Subsection 8.11.6 summarizes the mitigation measures that reduce the project's potential impacts on visual resources to a level of less than significant. Subsection 8.11.7 identifies the laws, ordinances, regulations, and standards that are applicable to the project. Subsection 8.11.8 lists the references used in preparation of this section. All figures are located at the end of this subsection.

8.11.2 Affected Environment

8.11.2.1 Regional Setting

Land uses within San Francisco are diverse. The western and northwestern shorelines provide areas for open space and recreation, and the northeastern and eastern shorelines provide opportunities for maritime commercial activities and other waterfront uses. Commercial and residential uses are located throughout the City. Open spaces, such as parks, landscaped areas, or undeveloped natural areas, are also found throughout the City. Major roads and freeways both connect and divide neighborhoods, commercial districts, and industrial areas.

The larger landscape region within which the project is located is the northern San Francisco peninsula. The landscape of this region is characterized by the open waters of the Pacific Ocean and San Francisco Bay, various types of developed areas including commercial, residential, and industrial structures, local streets and state highways, and open spaces. The Ocean and Bay play important roles in this landscape region in that they are often the focus of views from the hills and shoreline areas, in addition to being places of human activity.

Yerba Buena Island and Treasure Island and the Golden Gate and San Francisco-Oakland Bay bridges crossing the Bay also are distinctive and well-known features. Distance, in combination with haze, smog, or fog often limits visibility from Yerba Buena Island. The project site is visible from the Bay Bridge, but it is a background view (greater than 3 miles), and the bridge structure partially screens views, so onsite features are not clearly

discernible. The East Bay hills form the regional backdrop on the eastern side of the Bay. Views toward the project site are available at public viewpoints, private residences, and parks. The San Francisco Bay to the east of the project site forms a distinctive view, and the hills within San Francisco to the west of the project site are focal features, and may define local neighborhoods. View opportunities toward the project site exist at the higher elevations on the hills, but due to the distance, site features are not clearly evident.

The project site is currently not clearly visible from ferries, private vessels, or personal watercraft out on the Bay, due to the existing Port facilities, parked semi-truck trailers, and other structures located shoreward (northeast, east and southeast) of the project site. These existing features all serve to screen the project site from view from the Bay. The view of the site from the water is considered to be from the middleground.

Interstate 280 (I-280), located approximately 0.4 mile to the west of the project site, is a major commuter route and entry into the City. The project site is seen for a relatively short duration when traveling northbound on the freeway. Fewer opportunities to view the site are available when traveling southbound on I-280. Highway 101, another major route in the City, is located approximately 0.65 mile west of I-280. The project site cannot be seen from Highway 101.

The area that includes the project site is an industrially-zoned area that includes a mix of industrial and commercial uses, and worker lofts. This area includes Indiana, Minnesota, and Tennessee streets between 18th Street and Cesar Chavez Street. The closest residences (worker lofts) to the project site are located on Minnesota Street near 25th Street, approximately 1,600 feet west of the project site. The project site is visible from these lofts only from the uppermost floors from east-facing windows. Views from the lower floors are obstructed by intervening structures on Tennessee, Third, and Illinois streets.

SBC Park is located approximately 1.8 miles north of the project site in the China Basin area. The higher stands in the Park may afford views to the south toward the project site; however, these views are dominated by the Bay, ball field, and surrounding lights, and are obstructed by the industrial development between the Park and the project site.

The taller structures in the downtown area of the City provide views of parts of the Bayshore, with some southward views toward the project from approximately 2.2 to 3.2 miles away. These views are from offices and residences. Although viewers in the downtown area could be focused south frequently and for long periods of time, the project site is a very small part of the view and there are many other manmade structures and natural landscape features in the intervening landscape that draw viewers' attention.

8.11.2.2 Project Vicinity Setting

Photographs were taken in February 2005 to document the character of the landscape in the vicinity of the project site. Figure 8.11-1 is an aerial map of the area that depicts the project site, the construction laydown area, and the proposed alignments for the underground electric transmission line, the natural gas supply line, the potable water line, and the process water line. It also shows the relative locations where the photos were taken and indicates the direction that the camera was focused for each photo.

Photo LC-1 on Figure 8.11-2 is the view looking west toward the project site from the project construction laydown area, which is located immediately adjacent to and east of the project site. At the far right of the photo is an existing cement company facility that will be removed from the project site prior to the project being constructed. Near the center of the photo in the distance is Potrero Hill, upon which the Watchman Way residences are located. KOP 1 is located on Watchman Way.

Photo LC-2 on Figure 8.11-2 is the view looking east toward the project site from the Illinois Street/25th Street intersection. Illinois Street is in the immediate foreground. The undeveloped site that fronts onto Illinois Street in the photo is the site of the proposed MUNI Metro East Light Rail Maintenance and Operations Facility. The undeveloped site in the distance is the project site. To the left of the light pole that is located to the left of photo center is the existing cement batch plant facility that will be removed from the project site. Further in the distance are Port buildings and cranes. This viewpoint is approximately 0.2 mile from the site.

Photo LC-3 on Figure 8.11-3 is the view looking south along Illinois Street toward the existing switchyard located at the southeast corner of the Illinois Street/22nd Street intersection. This is the proposed northern terminus of the underground electric transmission line. The transmission line would surface and connect to a structure within the switchyard.

Photo LC-4 on Figure 8.11-3 shows the view looking south along Illinois Street from the 23rd Street intersection. The proposed underground transmission line will be aligned along this portion of Illinois Street.

Photo LC-5 on Figure 8.11-4 shows the view looking east along 24th Street from the Illinois Street intersection. The proposed underground transmission line will be aligned along this portion of 24th Street.

Photo LC-6 on Figure 8.11-4 shows the view looking south along Michigan Street from the 24th Street intersection. The proposed underground transmission line will be aligned along this portion of Michigan Street. Michigan Street dead-ends at 25th Street and the northern boundary of the MUNI site.

Photo LC-7 on Figure 8.11-5 shows the view looking east along 25th Street from the Michigan Street intersection. The proposed underground transmission line and the proposed natural gas line will be aligned along this portion of 25th Street (a gravel road), and will terminate at the project site, located toward the right side of the photo in the distance. An existing cement batch plant facility is shown in the northern portion of the project site (in the right one-third of the photo). This portion of 25th Street is a private road that provides access to the cement plant. The cement plant will be removed from the project site prior to project construction.

Photo LC-8 on Figure 8.11-5 shows the view looking west along 25th Street from the Michigan Street intersection. The proposed natural gas line will be aligned along this portion of 25th Street and will terminate at Illinois Street.

Photo LC-9 on Figure 8.11-6 shows the view looking north along an unsigned street from Cesar Chavez Street toward the eastern terminus of the proposed process water line at the

project site. The Port of San Francisco is shown toward the right side of the photo. Cesar Chavez Street is shown in the immediate foreground. The 125-foot-high structure and 300-foot-high Unit 3 exhaust stack at the Potrero power plant are seen to the right of center in the photo. That power plant is located to the north of the project site approximately 0.2 mile away. The exhaust stack is a visually prominent landmark in this portion of San Francisco.

Photo LC-10 on Figure 8.11-6 shows the view looking west along Cesar Chavez Street from the Port of San Francisco. The proposed process water line will be aligned along this portion of Cesar Chavez Street.

Photo LC-11 on Figure 8.11-7 shows the view looking west along Cesar Chavez Street from Minnesota Street. I-280 (elevated structure) is shown in the photo. The proposed process water line will be aligned along this portion of Cesar Chavez Street.

Photo LC-12 on Figure 8.11-7 shows the view looking northwest along the alignment of the proposed process water line at the eastern end of Marin Street. Railroad tracks are shown atop the berm shown on the right side of the photo.

Photo LC-13 on Figure 8.11-8 shows the view looking east along Marin Street toward the dead-end of the street. This is the western terminus of the proposed process water line. A Federal Express building and parking lot is shown on the right side of the photo. The elevated railroad tracks are shown just beyond the roadway's dead-end, and just beyond the railroad tracks is the elevated I-280.

Photo LC-14 on Figure 8.11-9 shows a view of Warm Water Cove Park, looking south from the northern edge of the park. The park is located at the eastern dead-end of 24th Street. As shown, a graffiti-painted wall abuts the southern boundary of the park. Photo LC-15 on Figure 8.11-9 shows a view of the park looking south near the eastern edge of the park. The construction laydown area is marked on the photo; currently, it is a gravel parking lot for semi-truck trailers. The photo also shows the building and associated facilities at the cement company facility that screen views of the project site from the park. Warm Water Cove Park is located approximately 0.1 mile north of the project site. The park has picnic tables, a short trail, a pier, and landscaping that does not appear to be well maintained. The park appears to have a low level of use. The San Francisco General Plan's Recreation and Open Space Element identifies this park for improvement (CCSF, 1998a). The San Francisco General Plan's Central Waterfront Area Plan also identifies this park for improvement (CCSF, 1998b). The high quality views from the park are those that are oriented toward the Bay. The views in other directions are dominated by industrial structures and disturbed or paved areas.

Photo LC-16 on Figure 8.11-10 is a panoramic view looking east toward the Bay from Watchman Way on Potrero Hill. Watchman Way is located approximately 0.6 mile west of the project site. Watchman Way is the KOP 1 location, and photo LC-16 depicts the view that residents along Watchman Way and nearby currently have when looking east toward the Bay. This view is representative of the view from up to 100 residential units (10 multi-family buildings on or near Watchman Way, each having 8 or 9 units plus single-family units in the area). This view is also representative of what residents in the uppermost floors of the worker lofts located on Indiana, Minnesota, and Tennessee streets

(at a lower elevation than Watchman Way) will see. (The worker lofts were not chosen as Key Observation Points [KOPs] because public access to those buildings was not allowed.) It is acknowledged that the Watchman Way view shown in photo LC-16 is more distant than the lower elevation worker lofts; however, photo LC-16 provides a clearer (less obstructed) view of the project site than will likely be available at the lower elevation worker lofts.

8.11.2.3 Project Site Setting

The San Francisco Electric Reliability Project (SFERP) is proposed to be developed in an industrial setting near the western shore of San Francisco Bay within the City and County of San Francisco (CCSF) at the location indicated on Figure 8.11-1. The project site consists of an approximately 4-acre area that is adjacent to and east of an undeveloped field planned to be developed into a City of San Francisco MUNI light rail vehicle maintenance and operations facility. The project site and the MUNI site are now primarily undeveloped open space. The MUNI site has what appear to be a few footings installed in various locations throughout the site. The project site has a cement plant at the northern end of the site that is currently operational; the remainder of the site is undeveloped open space. Views of the project site and the MUNI site are shown in photos LC-1 and LC-2 on Figure 8.11-2. Those photos document the existing condition, character, and visual quality of the site. As review of the photos suggests, the site does not contain any features that will be considered to be scenic resources. The visual quality of the site is considered low.

The project site is bounded on the north by a cement company facility that has access provided by a gravel road (25th Street). The site is bounded on the west by the undeveloped MUNI site, and is bounded on the east by a gravel-surface parking lot for semi-truck trailers. The site is bounded on the south by a building that fronts onto Cesar Chavez Street.

8.11.2.4 115-kV Transmission Line Route

The proposed underground 115-kV electric transmission line will be about 3,000 feet (0.56 mile) long (see Figure 8.11-1). It would connect the project switchyard to the existing PG&E 115-kV Potrero Substation. The underground line would be aligned west along 25th Street from the project site, north along Michigan Street, west along 24th Street, and north along Illinois Street. Entrance to the PG&E Substation is being considered via two options: (1) entry into the substation from Illinois Street, or (2) entry into the substation from 22nd Street. The visual quality of the proposed alignment is demonstrated in photos LC-3 and LC-4 on Figure 8.11-3, LC-5 and LC-6 on Figure 8.11-4, and LC-7 on Figure 8.11-5, and is considered low.

8.11.2.5 Natural Gas Pipeline Route

The proposed 12-inch-diameter (or smaller) underground natural gas pipeline (see Figure 8.11-1) will be approximately 900 feet (0.16 mile) long. It would provide natural gas to the project site via a connection to the existing PG&E San Francisco line 101, located at the intersection of Illinois Street and 25th Street. The visual quality of the proposed alignment is demonstrated in photos LC- 7 and LC-8 on Figure 8.11-5, and is considered low.

8.11.2.6 Process Water Pipeline Route

The proposed underground process water pipeline will be approximately 0.76 mile long. It will begin at the southeastern corner of the project site, be routed south along the unsigned

street, be aligned west along Cesar Chavez Street, will turn south just past the railroad tracks on the west side of I-280, paralleling the railroad tracks, and turn west to its terminus near the eastern dead-end of Marin Street. The route is shown on Figure 8.11-1. Photos of the route (LC-9 and LC-10 on Figure 8.11-6, LC-11 and LC-12 on Figure 8.11-7, and LC-13 on Figure 8.11-8 show the area through which this pipeline will be aligned. As shown, the area is a completely developed landscape devoted to urban (primarily industrial) uses. It has a moderately-low to low visual quality.

8.11.2.7 Potable Water Pipeline Route

The proposed 300-foot-long underground potable water pipeline will begin at the southeastern corner of the project site, be routed south along the unsigned street until its connection to a City main located on Cesar Chavez Street (see Figure 8.11-1). The landscape character of that area is demonstrated in photo LC-9 on Figure 8.11-6. The area is considered to have low visual quality.

8.11.2.8 Construction Laydown Area

The 8.5-acre construction laydown area is located adjacent to the project site, abutting the eastern boundary of the project site. The laydown area's western boundary is located approximately 100 feet west of the unsigned street, and its eastern boundary is located about 120 feet west of the edge of the Bay. Its northern boundary is 25th Street and its southern boundary is approximately 200 feet north of Cesar Chavez Street (see Figure 8.11-1). The site is a previously disturbed, relatively flat parcel of land with no permanent structures on it. During the February 2005 site visits, trailers for semi-trucks were parked in the construction laydown area. The area is considered to have a low visual quality.

8.11.2.9 Existing Lighting in the Project Vicinity

The project site (except for the cement plant onsite), when viewed at night, nearly fades from view because of the lack of lighting and development currently at that site. The proposed MUNI site nearly fades from view at night because of the lack of lighting and development there.

Existing visible night lighting in the project vicinity is substantial, ranging from softer amber-colored light to intense white light. Light sources include the following:

- Amber-colored street lights on Illinois Street (the street lights are closely spaced along the portion of Illinois Street that fronts the MUNI site); away from the MUNI site, the lights are spaced further apart
- Green light on a building located on the southeast corner of Illinois Street and 23rd Street
- Amber-colored street lights on 24th Street both east and west of Illinois Street
- Red lights on the cranes located at the Port; some of the lights flash but most are non-flashing
- Street lights along Third Street, 23rd Street, Cesar Chavez Street, Michigan Street
- Car head-lights and tail-lights along each street

- Lights on billboards on Cesar Chavez Street
- Lights atop a building on the corner of Third Street and Cesar Chavez Street
- Several lights at the Potrero Power Plant and the Switchyard south of Humboldt Street
- Lights on a building on Michigan Street
- Lights near the roofline of buildings on 24th Street east of Michigan Street
- A tall amber light pole within the heavy equipment yard on Michigan Street
- Amber-colored lights at the cement plant at the eastern end of 25th Street (at the project site)
- Lights on Potrero Hill

Many of the lights are unshielded or occur in clusters, creating a more prominent visual source of light.

8.11.2.10 Sphere of Influence

The visual sphere of influence (SOI) for the proposed project represents the area from which the project has the potential to be visible. Depending on location, views toward the proposed power generating facility could be blocked by other structures, trees, shrubs, or other features in the viewer's immediate foreground. From some viewpoints, only the tops of the project's taller features will be visible. From other viewpoints, where there are open or partially open views toward the site, the proposed power generating facility has the potential to be more visible.

The boundaries of the SOI (the area of potential visibility around the project) are considered to extend no more than 3 miles from the project site. This is because elements of a view that are 3 miles or more away are considered to be a part of the background, the landscape zone in which little color or texture is apparent, colors blur into values of blue or gray, and individual visual impacts become less apparent (USDA, 1973). In addition, observations of larger combined-cycle power plant projects indicate that after about 2.5 miles, the facility's details become blurred and the facility becomes a relatively small element in the overall landscape, with a very limited level of visual prominence.

The SOI for this project needs to take into account the existing structures in the area. Figures 8.11-11a and 8.11-11b show the 3-mile boundary around the project site. It also shows the areas where views toward the project site are either partially or fully obstructed due to topographic conditions. It does not take into consideration the screening effects of minor variations in terrain, adjacent development, or vegetation, which will further limit views of the site. Beyond the mapped SOI, the proposed project is not expected to be visible due to screening, or will be of such a small size in the background field of view that significant impacts to visual resources will not be expected.

8.11.2.11 Sensitive Viewing Areas and Key Observation Points

To structure the analysis of the project's effects on visual resources, the view areas that will be the most sensitive to the project's potential visual impacts and the sensitive receptors in

those areas were identified. (Typically, residents and recreationists are considered to be sensitive receptors to changes in the landscape. This is because of the potential for effects to their long-term views or their enjoyment of a particular landscape or activity.) Representative viewpoints from these sensitive receptor locations are referred to as KOPs.

One KOP was selected for detailed analysis for the proposed project. The KOP was selected based on (1) the expected unobstructed views of project facilities from the residences in that area, and (2) the photo being generally representative of views from several residential areas and from I-280 and the Potrero Hill Recreation Center. One KOP was determined to be sufficient for this analysis due to the limited views of the project from lower elevations on streets near the project site, and the fact that the views from the uppermost floors of the worker lofts on those streets will be similar to the view seen from the KOP chosen at the higher elevation on Watchman Way, on Potrero Hill. The KOP selected on Watchman Way, is therefore, considered representative of both the residences on Potrero Hill and the worker lofts located in the industrial area where the project is located.

Figure 8.11-1 indicates the location where the one KOP photo was taken and the direction that the camera was focused for the photo. The KOP "existing view" photo is the "before" view of the project site. As shown, the area selected for the KOP lies approximately 0.6 mile from the project site and is, therefore, an area in which project features will be visible in the middle ground (the middleground view zone is generally 0.5 mile to 3 miles from the viewer).

For the KOP, a photo simulation was developed to serve as a basis for visualizing the project's potential effects from that representative location. In evaluating the sensitivity of the viewing areas potentially affected by the project, consideration was given to distance from the project site, numbers of viewers, and the presence of residential or recreational uses. The visual analysis is not based solely on the view from this KOP.

To respond to the CEC's requirement that an assessment be made of the visual quality of the landscape potentially affected by the project, the discussion of the view seen from the KOP includes ratings of the visual quality of the landscapes that they represent. These ratings were developed based on a series of in-field observations carried out in February 2005, review of photos of the affected area, and review of methods for assessment of visual quality. The final assessment of the visual quality of the view from the KOP was made based on professional judgment that considered a broad spectrum of landscape assessment factors. The factors considered included evaluation of:

- Natural features, including topography, water courses, rock outcrops, and natural vegetation
- The positive and negative effects of man-made alterations and built structures on visual quality
- Visual composition, including assessment of the complexity and vividness of patterns in the landscape.

The landscape quality ratings expressed as a scale of six landscape quality classes are listed in Table 8.11-1. This rating system is based on the scale developed for use with an artificial intelligence system for evaluation of landscape visual quality developed by a group of

landscape scholars at Virginia Tech (Buhyoff et al., 1994). The scale has a common-sense quality and is readily understandable. It defines landscape quality in relative terms, contrasting landscapes that are average in visual quality with those that are above and below average, and those that are at the top and bottom of the landscape quality spectrum.

TABLE 8.11-1
Landscape Visual Quality Scale Used in Rating the Areas Potentially Affected by the Proposed Project

Rating	Explanation
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes will be significant regionally and/or nationally. They usually contain exceptional natural or cultural features that contribute to this rating. They will be what we think of as "picture post card" landscapes. People will be attracted to these landscapes to be able to view them.
High Visual Quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These are often landscapes which have high potential for recreational activities or in which the visual experience is important.
Moderately High Visual Quality	Landscapes which have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained in the landscape, to the arrangement of spaces, in the landscape, or to the two-dimensional attributes of the landscape.
Moderate Visual Quality	Landscapes which have average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape.
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but the landscape is not dominated by these features. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes with low scenic value. The landscape is often dominated by visually discordant man-made alterations; or they are landscapes that do not include places that people will find inviting and lack interest in terms of two-dimensional visual attributes.

Source: Buhyoff et al., 1994.

The environment surrounding the project site, including the area where the proposed underground electric transmission line, natural gas pipeline, process water pipeline, potable water pipeline, and construction laydown area are located, is a landscape of moderately-low to low visual quality. It is characterized by developed urban uses that include industrial, port, and power plant facilities located in an industrial setting within the City of San Francisco.

Near the project site, views of the Bay are largely obscured by existing facilities. From higher elevations, such as on Potrero Hill located to the west of the project site approximately 0.6 mile, views of the Bay exist to varying degrees, depending on the height and mass of the structures along the western shore of the Bay. On foggy days, views of the Bay are obstructed; on clear days, it may be possible to see the East Bay Hills on the east side of the Bay. In addition, the 300-foot-high Potrero Unit 3 stack that is located to the north of the project site becomes less visible on foggy days, except for the plume that it emits. On warm, clear days, the Potrero stack typically does not emit a plume.

The KOP selected for project analysis is described below.

8.11.2.11.1 KOP 1 – Watchman Way. Figure 8.11-12a depicts the view from KOP 1, a residential area on the east slope of Potrero Hill that is located approximately 0.6 mile northwest of the project site. The photograph was taken from an area that is between several multi-family residential buildings, and is considered representative of up to 100 residences that are located on the east slope of Potrero Hill. It may also represent the view seen by recreationists at the Potrero Hill Recreation Center, although views to the east from that area are largely screened by the mature vegetation. This location may also represent the fleeting view of passengers in vehicles that are traveling north on I-280 when their view is focused to the east. The elevation of the motorists traveling on I-280 will not be as high as the residences located on Watchman Way, so passengers' views of the project site are more obstructed than at the residences.

As shown in photo LC-16 on Figure 8.11-10 and also the existing condition photo on Figure 8.11-12a, the urban setting is the dominant theme of the photo. Residences are located in the immediate foreground. I-280 is shown, as are electrical distribution conductors. Industrial development is seen in both photos between the freeway and the edge of the Bay. The green grassy area shown to the right of photo center of LC-16 is the MUNI site and the project site further distant. From the viewpoints shown in Figures 8.11-10 and 8.11-12a, the project facilities will be located behind the MUNI building. The combination of the MUNI development and the project will eliminate the green grassy area from view.

If this view were evaluated only in terms of the industrial development visible in the foreground and middleground, the sensitivity of the view will be considered to be low and the level of visual quality will be considered to be low as well. However, the view also includes an expansive panorama of the Bay and East Bay hills that are visible on clear days in the background. Taking the entire view into account, the visual quality of the view is moderately low to moderate, and the level of sensitivity is moderate.

8.11.3 Environmental Consequences

8.11.3.1 Proposed Project Appearance

8.11.3.1.1 Generating Facility and Switchyard. The proposed project facilities are described in detail in Chapter 2.0, Project Description. Figure 2-2 shows the layout of the proposed project features on the site, and Figure 2-3 provides typical elevation views. Table 8.11-2 summarizes the dimensions of the generating facility's major features.

TABLE 8.11-2
Approximate Dimensions of the Major Project Features

Feature	Height (feet)	Length (feet)	Width (feet)	Diameter (feet)
Combustion Turbine Generators (CTGs)				
Combustion turbines & generators (base unit)	14.5	56.5	13.5	—
Inlet air filters	12	33	37	—
SCR casings	33	60	25	—
CTG exhaust stacks	85	—	—	12

TABLE 8.11-2
Approximate Dimensions of the Major Project Features

Feature	Height (feet)	Length (feet)	Width (feet)	Diameter (feet)
Chiller cooling tower	45	48	38.5	—
Tanks				
Deionized (DI) water storage tank	32	—	—	42
Treated water storage tank	32	—	—	60
Aqueous ammonia storage tank	—	30	—	8
Administration/Control/Service building	30/18	180	75	—
Recycled water building	32	150	64	—

The proposed features would change the existing landscape from a site that is mostly undeveloped (the exception is the existing cement plant that will be removed prior to project construction) to a paved site with several onsite buildings and electrical generation and transmission structures. Three 85-foot-tall stacks will be the tallest project features at the site. The exteriors of all project elements will be treated with a neutral gray finish that will optimize visual integration with the surrounding environment. With project implementation, much more of the site will be occupied with equipment than is currently the case, and the site, when viewed from adjacent parcels, will appear more orderly and maintained than it does now.

Site ingress and egress during project operation will be from a proposed gated entrance near the northwest corner of the site on 25th Street. A facility sign will be posted at the entrance. No landscaping is proposed as part of the project. The wall will be given a dull, neutral finish to minimize its visual contrast with its surroundings. In addition, an 8-foot-high chain link fence with a dulled finish and an additional 2 feet of barbed or razor wire will be installed around the project site perimeter. Depending on the distance and elevation of the viewer to the project site, the chain link fence may partially screen views of onsite electrical equipment.

8.11.3.1.2 Transmission Lines. The proposed electric transmission lines will be installed underground. It is expected that the only aboveground structures will be two steel transmission structures within the new switchyard to be located at the project site, and two structures also within the existing PG&E 115-kV Potrero Substation. The steel structures will be approximately 8 feet tall, each with 3 pot-heads (terminations for the insulated cable).

Construction of the proposed transmission line will occur in non-native soils that have been previously disturbed. Noticeable visual effects associated with the underground transmission line will be restricted to the project construction phase. During construction, the ground surface of the area along the alignment will be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete and pavement; and construction personnel and vehicles. These effects will be minor and temporary, lasting 3 months. This underground transmission line will not be a source of substantial long-term

change to the visual environment due to the restoration of the ground surface along the alignment as the project construction nears completion.

8.11.3.1.3 Natural Gas Pipeline. The proposed 12-inch-diameter underground natural gas pipeline would be approximately 900 feet long. It will connect to the PG&E system located at the intersection of Illinois Street and 25th Street. The only aboveground evidence associated with the natural gas line will be the natural gas metering station to be located within the project site (west side, in the southern one-third of the site). A 12-foot-high sound wall will be installed around the proposed natural gas fuel compression system.

Construction of the proposed natural gas pipeline will occur in non-native soils that have been previously disturbed. Noticeable visual effects associated with this pipeline will be restricted to the project construction phase. During construction of this pipeline, the ground surface of the area along the alignment will be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete and pavement; and construction personnel and vehicles. These effects will be minor and temporary, likely lasting a few months within the 12-month power plant construction period. This underground pipeline will not be a source of substantial long-term change to the visual environment due to the restoration of the ground surface along the alignment as the project construction nears completion.

8.11.3.1.4 Process Water Pipeline. The project includes a connection to the City's combined sewer system at a collection station near the eastern dead-end of Marin Street. The proposed diversion/control structure, pipeline, pump station, and ancillary equipment that will provide process water for the water treatment plant at the project site will be installed underground. The 0.76-mile-long pipeline route will begin at the southeastern corner of the project site, be routed south along the unsigned street, be aligned west along Cesar Chavez Street, will turn south just past the railroad tracks on the west side of I-280, paralleling the railroad tracks, and turn west to its terminus near the eastern dead-end of Marin Street (see Figure 8.11-1).

Construction of the proposed diversion/control structure, pipeline, pumps, and ancillary equipment associated with the process water pipeline will take place in non-native soils that have been previously disturbed during the construction and maintenance of the City combined sewer system. Noticeable visual effects associated with the diversion/control structure, pipeline, pumps, and ancillary equipment will be restricted to the project construction phase. During construction of these facilities, the ground surface of the area along the proposed alignment will be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete, pavement, and engineered cover; and construction personnel and vehicles. These effects will be minor and temporary, lasting approximately 4 months, and will not extend beyond the alignment disturbance area. Because the system will be located underground, and the ground surface will be restored as part of the project construction, these project features will not be a source of substantial long-term changes to the visual environment.

8.11.3.1.5 Potable Water Pipeline. The proposed underground potable water pipeline will be 300 feet long. It will begin at the southeastern corner of the project site, be routed south along the unsigned street until its connection to a City main located on Cesar Chavez Street. Construction of the proposed pipeline will take place in non-native soils that have been

previously disturbed. Noticeable visual effects associated with the pipeline and ancillary equipment will be restricted to the project construction phase. During construction of these facilities, the ground surface of the area along the proposed alignment will be temporarily disrupted by construction fencing and equipment; excavated piles of dirt, concrete, pavement, and engineered cover; and construction personnel and vehicles. These effects will be minor and temporary, likely lasting a few weeks within the 12-month power plant construction period and will not extend beyond the alignment disturbance area. Because the system will be located underground, and the ground surface will be restored as part of the project construction, these project features will not be a source of substantial long-term changes to the visual environment.

8.11.3.1.6 Construction Laydown Area. During the project construction period, the appearance of the project construction laydown area will change from that of a disturbed and graded parcel that has semi-truck trailers parked on it to a parcel occupied by construction materials and equipment. Materials delivery trucks and construction personnel will periodically enter and exit the site. A wood-slatted temporary cyclone fence will enclose the site. These visual changes will be substantial when compared to what currently exists on the site; however, they will be temporary and will not create an adverse long-term visual effect.

8.11.3.1.7 Lighting. Although the proposed power plant is a simple-cycle unit, it could be operated 24 hours per day, 7 days per week for periods of time. Its operation will require onsite nighttime lighting for safety and security. To reduce offsite lighting impacts, lighting at the facility will be restricted to areas required for safety, security, and operation. Exterior lights will be hooded, and lights will be directed onsite so that significant light or glare will be minimized. Low-pressure sodium lamps and fixtures of a non-glare type will be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits will be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the amount of lighting potentially visible offsite.

Project construction activities are planned to occur between 7:00 a.m. and 8:00 p.m. on Monday through Friday. In the event that nighttime construction activities become necessary, illumination that meets San Francisco, state, and federal worker safety regulations will be required during the nighttime construction period. To the extent possible, the nighttime lighting will be erected pointing toward the center of the site where activities are occurring, and will be shielded. Task-specific lighting will be used to the extent practical while complying with worker safety regulations.

8.11.3.1.8 Water Vapor Plumes. Experience with plants of this type has demonstrated that the high velocity and temperature of the stack exhaust result in a quick dispersion of stack plumes, minimizing the probability that a visible plume will be created above the stacks. Based on previous experience with these kinds of systems, it is likely that formation of visible plumes from the project will be a rare occurrence related to unusual combinations of cold and damp conditions, and that when present, the plumes will be relatively small. If fog is present, plumes may or may not be discernible in the fog.

The combustion turbines will be equipped with a small cooling tower that is designed to cool the turbine's intake air. The amount of heat that each cooling tower has to remove from the intake air is small; therefore, the volume of water vapor that emanates from a

simple-cycle cooling tower will be small. This will cause the frequency and size of any water vapor plumes that might be associated with the proposed cooling towers to be limited.

Sensitive receptors (residents and recreationists) in the vicinity of the project site are accustomed to seeing plumes being emitted from the existing 300-foot-high stack at the Potrero Power Plant located to the north of the project site. Plumes, if they do occur at the proposed plant, will not be substantial in size, and will not be out of character with the surrounding landscape because of the industrial nature of the area, the presence of the plume from the stack to the north, and the height of other structures in the area. To the extent that they will be emitted, the plumes that will be associated with the proposed plant will not substantially detract from views of the area or the Bay.

8.11.3.2 Analysis Procedure

This analysis of the visual effects of changes that might be brought about by the project is based on field observations and review of the following information: local planning documents, project maps and drawings, photographs of the project area, computer-generated visual simulations from each of the KOPs, and research on design measures for integrating electric facilities into their environmental settings.

Site reconnaissance was conducted to view the site and surrounding area, to identify potential KOPs, and to take representative photographs of existing visual conditions. A single-lens reflex (SLR) 35-mm camera with a 50-mm lens (view angle 40 degrees) was used to take site photographs.

A photograph of the view toward the project site from the KOP is provided to represent the "before" conditions from the KOP. A visual simulation of the same view toward the project was produced to illustrate the "after" visual conditions. The simulated image represents the project's appearance immediately after completion of its construction. The computer-generated simulation is the result of an objective analytical and computer modeling process described briefly below. The image is accurate within the constraints of the available site and project data. This method provides the viewer with a clear image of the location, scale, and visual appearance of the proposed project.

Computer modeling and rendering techniques were used to produce the simulated image of the view of the site as it will appear after development of the project. Existing topographic and site data provided the basis for developing an initial digital model. The project engineers provided a site plan, an elevation plan, and digital data for the project. In addition, a site plan and an elevation plan for the proposed MUNI development were provided, and were incorporated into the model. These were used to create a three-dimensional (3-D) digital model of the proposed project facilities and the proposed MUNI facility in order to accurately represent what the viewer will see from Potrero Hill.

For the KOP, the viewer location was digitized from topographic maps and scaled aerial photos, using 5.5 feet as the assumed eye level. A computer "wire frame" perspective plot was then overlaid on the photograph of the view from the KOP to verify scale and viewpoint location. The digital visual simulation image was produced as a next step, based on the computer rendering of the 3-D model combined with a high-resolution digital version of the base photograph. The final "hardcopy" visual simulation image that appears in this document was produced from the digital image file using a color printer.

8.11.3.3 Impact Evaluation Criteria

Analysis of the project's impacts was based on an evaluation of the changes to the existing visual resources that will result from construction and operation of the project. An important aspect of this analysis was evaluation of the "after" view provided by the computer-generated visual simulation, and comparison of it to the existing visual environment. In making a determination of the extent and implications of the visual changes, consideration was given to:

- The specific changes in the affected visual environment's composition, character, and any specially valued qualities
- The affected visual environment's context
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the likely changes

Significance criteria for impacts to aesthetic resources were developed from the CEQA Guidelines and the CEQA Checklist to evaluate the potential environmental impacts resulting from the project. The following criteria were applied:

- Will the project have a substantial adverse effect on a scenic vista?
- Will the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- Will the project substantially degrade the existing visual character or quality of the site and its surroundings?
- Will the project create a new source of substantial light or glare that will adversely affect day or nighttime views in the area?

8.11.3.4 Assessment of Visual Effects

8.11.3.4.1 KOP 1 – Watchman Way. Figure 8.11-12b is a simulated view of the project as it will appear from KOP 1 after both the project and the MUNI facility are constructed. Adding the power plant and MUNI facility will change the view by eliminating the green-grassy expanse of land in the center of the photograph, as seen by comparing Figure 8.11-12b to Figure 8.11-12a. However, when looking at the panoramic view from Watchman Way toward the Bay in Figure 8.11-10, this larger context photo provides a greater understanding of the level of industrial development in the area, i.e., the view already includes several tall industrial-type structures. In that photo, the green-grassy site appears almost out of context in the otherwise fully-developed landscape. Development of the site into industrial uses (both the proposed power plant and the MUNI facility) makes the landscape appear in context with surrounding industrial development. Figure 8.11-12c is a simulation showing the MUNI Facility without the proposed project.

The MUNI facility (in which construction will start in June 2005 and be completed in March 2008), includes a paint and body shop, a maintenance building, and open light rail

vehicle storage areas. It is located to the west of the project facilities (large gray building in Figure 8.11-12b) and screens the majority of the project facilities from the view. The project facilities that will be visible once the MUNI facility is constructed (and as shown in Figure 8.11-12b) include the three exhaust stacks, the chiller unit to the right of the stacks in the photo, some concrete structures around the transformers located to the left of the stacks in the photo, and some switchyard structures further to the left in the photo. Although these features are visible to the trained eye, they will not likely be very noticeable to the casual viewer. Because construction of the power plant will be complete in June 2007, and the MUNI facility will be complete in March 2008, the power plant will be visible from Watchman Way residences to varying degrees (more than shown in Figure 8.11-12b) for at most 9 months, depending on when in the MUNI facility construction period the large MUNI buildings will be built. Even if the view from Watchman Way residences is not screened by the MUNI facility, the presence of the proposed power plant at the project site would not degrade the visual quality of the view from the west.

Views of the project site from ferries, private vessels, or personal watercraft out on the Bay will likely continue to be screened by the existing Port facilities and other structures located shoreward (northeast and southeast of the project site). The view from the Bay from due east of the project site will likely be partially screened, assuming that the Port (1) resumes the parking of semi-truck trailers at the project construction laydown area, (2) uses that site as a construction laydown area for other nearby projects, or (3) develops the site into other industrial uses. Even if the due-east view is not screened from the Bay, the presence of the proposed power plant at the project site will not degrade the visual quality of that view.

The Bay is a scenic vista with a unique landscape. The addition of the project features to the view from Watchman Way will not detract from or degrade Watchman Way residents' view of the Bay. With the project, no change to the visibility of the Bay is expected. Further, the addition of the power-generating facility to the view will not change the KOP's moderately-low to moderate visual quality rating. Due to the moderate visual sensitivity of this view and its overall moderately-low to moderate visual quality, the project's impact on this view will be noticeable, but will be less than significant.

8.11.3.4.2 Light and Glare. The project's effects on visual conditions during hours of darkness will be very limited. As indicated in Section 8.11.3.1.4, some night lighting will be required for operational safety and security. There will be additional visible lighting associated with the project stacks, switchyard, and open site areas. High illumination areas not occupied on a regular basis will be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting will not be highly visible offsite and will not produce offsite glare effects. The offsite visibility and potential glare of the lighting will be restricted by specification of non-glare fixtures and placement of lights to direct illumination into only those areas where it is needed. With implementation of the project, the overall change in ambient lighting conditions at the project site, as viewed from the KOP and other nearby locations, will not be substantial.

Lighting that might be installed to facilitate nighttime construction activities will, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations.

8.11.3.4.3 Water Vapor Plumes. Plumes from project operation during either the daytime or nighttime hours will not be a major visual concern. As indicated in Subsection 8.11.3.1.5, plumes, if they were to form during project operation, will be relatively small. During the nighttime, plumes will be visible only if there were sufficient natural or artificial light. Because of the measures that will be taken to reduce project lighting at the plant, plumes that will be present during nighttime hours are not expected to be highly visible.

It should be noted that, because the conditions under which the plumes are likely to form are also conditions under which fog and rain are likely to be present, some of the time that plumes are present, they may not be visible because of the fog and rain. An additional variable that needs to be considered in evaluating the visual implications of the project's water vapor plumes is that many of the daylight, non-fog, non-rain hours when plumes are present would occur during the winter at times when the sky is overcast. During overcast conditions, the contrast of the plumes with the sky would be low, and because of the low degree of contrast, the visual prominence of the plumes would be substantially reduced.

Although the plumes, if present, would be small, during non-fog, non-rain daylight hours, they would have the potential to be seen in the project vicinity. Their visual prominence will be greatest in the foreground zone (up to 0.5 mile from the project site). A contextual factor that needs to be considered in evaluating the visual implications of the project's plumes is that much of the nearby area is devoted to industrial land uses, and the existing Potrero stack located to the north of the project site is already a source of visible plumes.

8.11.3.4.4 Construction Period Impacts. Construction laydown and parking areas will be within an approximate 8.5-acre area located adjacent to the east side of the project site (Figure 8.11-1). The laydown area's western boundary is located approximately 100 feet west of the unsigned street, and its eastern boundary is located about 120 feet west of the edge of the Bay. Its northern boundary is 25th Street, and its southern boundary is approximately 200 feet north of Cesar Chavez Street (see Figure 8.11-1).

The parked vehicles, equipment, and stored materials in the construction laydown area will be visible from the eastern ends of 25th Street and Cesar Chavez Street, and from the Bay. Although the vehicles, equipment, and stored materials in the laydown area will likely be somewhat visible (because a wood-slatted temporary cyclone fence would enclose the site), and would change the appearance of the site during the construction period, given the industrial character of the area, it will not reduce the site's visual quality, nor would it degrade views toward the construction laydown area. After development of the generating facility's structures is completed, all traces of the laydown area will be removed and the surface of the laydown area will be restored to existing conditions.

Construction access to the project site will generally be from Illinois Street to 25th Street (to access the north side of the site), and from Illinois Street to Cesar Chavez Street to the unsigned street (to access the south side of the site). Materials and equipment delivery are expected to occur via truck.

Construction of the project from site preparation and grading to commercial operation is expected to take approximately 12 months, with commercial operation expected to commence in the second quarter of 2007. During the construction period, it is expected that cranes, heavy equipment, and construction personnel will be at the project site.

Construction activities and the presence of construction equipment and personnel, and materials will temporarily change the landscape at the site.

8.11.4 Impact Significance

A discussion regarding whether the visual effects of the project will be significant pursuant to CEQA is provided below. The assessment of these impacts has been structured by applying the criteria set forth in Appendix G of the State CEQA Guidelines. The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance (14 CCR 15382)." The four questions related to aesthetics that are posed for lead agencies and the answers to them are:

1. Will the project have a substantial adverse effect on a scenic vista?

   No. There are no designated scenic roads or vista points in the project viewshed. Although I-280 in the project vicinity is considered eligible for inclusion in the California Scenic Highway Program, it has not been designated, so no scenic quality protection is afforded. Implementation of the project will not result in significant adverse effects on views of the Bay from this freeway, as suggested by Figure 8.11-12b. As the analysis of the view from the KOP has established, the project would not affect any landscapes of more than moderately-low to moderate visual quality, and any effects to the existing visual quality of landscapes in the area would not be substantial.

2. Will the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

   No. This question does not apply to the proposed project because none of the project facilities fall within the boundaries of a state scenic highway.

3. Will the project substantially degrade the existing visual character or quality of the site and its surroundings?

   No. The site itself is a flat parcel in an area that is devoted entirely to heavy industry and port uses. An important visual resource in the area is the Bay and East Bay hills, as viewed from San Francisco. Project implementation will not result in significant adverse impacts to those views. Although the presence of the project will change the character of nearby views toward the site, there will be no change in the visual quality of the view. Although the view toward the site will be changed, it will not be changed in a way that could be construed as being substantially degraded.

   Visible project plumes, if they were to occur, will be relatively small, and would not substantially degrade the existing visual character of the site and its surroundings. This is because the general landscape setting of the project is one in which industrial facilities and visible plumes are already present.

4. Will the project create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?

No. As described in Section 8.11.3.1.4, project light fixtures would be restricted to areas required for safety, security, and operations. Lighting will be directed onsite; it would be shielded from public view, and non-glare fixtures and use of switches, sensors, and timers to minimize the time that lights not needed for safety and security are on would be specified. These measures would substantially reduce the offsite visibility of project lighting.

Any lighting that might be installed to facilitate nighttime construction activities will, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting will be used to the extent practical while complying with worker safety regulations. With these measures, lighting associated with the project construction and operation will not pose a hazard or adversely affect day or nighttime views toward the site.

8.11.5 Cumulative Impacts

The area in which the project site is located is an area that is developed into industrial and port land uses. The City indicates in its land use plans that it intends to fully develop the shoreline area; many new developments are currently planned along the San Francisco waterfront from Fisherman's Wharf to China Basin. Recently completed projects within the project vicinity include the construction of 63 new housing units within the area and a commercial structure at the Cesar Chavez Street/Third Street intersection. In addition, the City is currently constructing a light rail extension down Third Street; construction of that project will be complete before the proposed project will be licensed.

Present and foreseeable projects in the project vicinity include the MUNI facility adjacent to and west of the project site (expected to be operational in March 2008), 398 additional housing units and several hundred thousand square feet of commercial development that has either been approved or are pending approval by the City. If the Central Waterfront Neighborhood Plan is adopted development of an additional 1,500 housing units would be encouraged in the Central Waterfront area.

The Port of San Francisco is planning a large mixed-use development at Pier 70. In addition, there are several other projects planned or under construction south of the project site: (1) a multi-modal bridge over Islais Creek that will link Illinois Street to Cargo Way and will provide access for rail, truck traffic, and bicyclists, with construction to start in March 2005, lasting 18 months; (2) two concrete/cement batch plants south of Islais Creek on Piers 92 and 94, with both plants expected to be operational by summer 2005; and (3) Pier 90-94 Backlands 44-acre site is in the initial planning phase for a distribution and warehouse complex.

The only other commercial electrical generation project proposed within the project study area is Potrero Unit 7. The proponent of Potrero Unit 7, (Mirant) is in bankruptcy proceedings and the application for certification before the California Energy Commission for Potrero Unit 7 is currently suspended. Further, it is formal City policy to oppose the construction of Potrero Unit 7. Accordingly, the City considers the construction of Potrero Unit 7 to be highly unlikely. Moreover, the City is pursing the SFERP in order to support shutdown of units at the Potrero power plant, in particular Potrero Unit 3. Thus, overall

electric generation within Southeast San Francisco should ultimately be reduced by the construction of the SFERP.

Each of these projects would contribute to a change in the landscape character of the area.

The proposed project will change the landscape at the project site by adding project facilities and paving the site. These changes would result in the site appearing more developed and orderly. However, the development of the proposed project would not result in a significant adverse contribution to cumulative visual impacts on the landscape of the area. This is because the proposed facilities would be sited in an area designated and planned for industrial development and the adjacent sites are already developed or are planned for development (e.g., the MUNI site). The proposed facilities would be in character with the surrounding landscape.

8.11.6 Mitigation Measures

8.11.6.1 Natural Gas Pipeline, Process Water Pipeline, and Potable Water Pipeline

The following mitigation measures have been included as part of the project proposal to reduce the visual impacts of the proposed pipelines:

- After construction, ground surfaces will be restored to their original condition, and any vegetation that had been removed during the construction process will be replaced with like-kind vegetation.

8.11.6.2 Power Plant

The following mitigation measures have been included as part of the project proposal to reduce the visible changes to ambient lighting and from glare from project facilities proposed at the project site:

- Minimize lighting to areas required for safety, security, or operations, and shield lighting from public view to the extent possible. Use timers and sensors to minimize the time that lights are on in areas where lighting is not normally needed for safety, security, or operation.
- Direct and shield lighting to reduce light scatter and glare. Use highly directional light fixtures.
- Use flashing red warning lights on project structures only where required.
- Use minimal signage, and construct project signs using non-glare materials and unobtrusive colors, in accordance with the San Francisco Planning Code. Conform the design of any signs required by safety regulations the criteria established by those regulations.
- Specify neutral gray matte finish on project facilities to the extent it is standard for the industry.
- Specify dulled gray finish on the site perimeter fencing.
- Specify dulled and neutral finish on the sound wall to be constructed around the gas compressors.

8.11.6.3 Transmission Lines

The following mitigation measures for the transmission lines have been included in the project design:

- The structures within the switchyards where the underground transmission lines will terminate will be constructed of steel so as to coordinate with the existing facilities at both switchyards.

8.11.7 Laws, Ordinances, Regulations, and Standards

8.11.7.1 Introduction

This section describes the LORS relevant to the visual resource issues associated with the project. No federal visual resource laws, ordinances, regulations, or standards exist. However, visual resource and urban design policies applicable to the project are addressed in the San Francisco General Plan, the Central Waterfront Neighborhood Plan, the Planning Code, the Zoning Map, and the Port of San Francisco Waterfront Land Use Plan.

Because the of the project site's proximity to I-280, the California Department of Transportation's (Caltrans) Scenic Highways Program was reviewed. Due to the local importance of the 49-Mile Scenic Drive, it is also discussed in this section.

Table 8.11-3 lists the San Francisco plans and the Caltrans provisions that are pertinent to the project and visual resources. The specific provisions that have potential relevance to the project and visual resources are identified in Subsections 8.11.7.2 through 8.11.7.5.

TABLE 8.11-3
Laws, Ordinances, Regulations, and Standards Applicable to San Francisco Electric Reliability Project Visual Resources

LORS	Purpose	Supplement A Section Explaining Conformance	Agency Contact
San Francisco General Plan (Urban Design, Environmental Protection, and Commerce and Industry elements, Central Waterfront Area Plan, South Bayshore Area Plan, and Central Waterfront Neighborhood Plan [Draft for public review])	Describes policies for guiding future development within San Francisco.	Subsection 8.11.7.2	San Francisco Planning Department Jasper Rubin 1660 Mission Street San Francisco, CA 94103 (415) 558-6310
San Francisco Planning Code and Zoning Map	Establishes zoning districts governing land use and requirements for buildings and district improvements.	Subsection 8.11.7.3	Same as above
Port of San Francisco Waterfront Land Use Plan	Guides revitalization and reinvestment in the Port of San Francisco waterfront.	Subsection 8.11.7.4	Port of San Francisco Floristine Johnson Pier 1 San Francisco, CA 94111 (415) 274-0526

TABLE 8.11-3
Laws, Ordinances, Regulations, and Standards Applicable to San Francisco Electric Reliability Project Visual Resources

LORS	Purpose	Supplement A Section Explaining Conformance	Agency Contact
Scenic Roadway Programs (Caltrans and 49-mile Drive)	To preserve and enhance the natural beauty of California. The 49-Mile Scenic Drive passes by San Francisco's scenic attractions and historic highlights.	Subsection 8.11.7.5	Dennis Cadd State Scenic Highway Coordinator Office of State Landscape Architecture Caltrans 1120 N Street Sacramento, CA (916) 654-5370

8.11.7.2 San Francisco General Plan and the Central Waterfront Neighborhood Plan

The project will be located within an existing industrial area within the City and County of San Francisco, and is, therefore, subject to the provisions of the San Francisco General Plan.

Three elements of the General Plan (Urban Design, Environmental Protection, and Commerce and Industry) include provisions for the protection of the landscape and visual resources. The Urban Design Element addresses the physical character and order of the City, and the relationship between people and their environment. The Environmental Protection Element addresses the impact of urbanization, including the use of oil and gas resources and hazardous waste on the natural environment. The Commerce and Industry Element calls for continued economic vitality, social equity, and environmental quality.

The Central Waterfront Area Plan, a part of the General Plan, has jurisdiction over the project site. The Central Waterfront covers the eastern shoreline of San Francisco between China Basin and Islais Creek and adjacent inland areas. The Central Waterfront Area Plan guides the future development of the Central Waterfront to serve the varying needs and interests of San Francisco. The Area Plan includes maritime and economic development policies, housing policies, and establishes policies regarding transportation, recreation, commerce, and urban design and historic preservation.

In addition, the South Bayshore Area Plan, a part of the General Plan, has jurisdiction over a portion of the process water line. The western portion of the process water line will be located within the Northern Industrial Sub-district of the Plan. The Plan guides the future development of the South Bayshore district of San Francisco, which includes the area south of Cesar Chavez Street and east of Highway 101. The Plan includes policies and objectives related to land use, transportation, housing, commerce, industry, recreation and open space, urban design, community facilities and services, and public safety.

The draft Central Waterfront Neighborhood Plan planning area is bounded to the north by Mariposa Street, to the west by I-280, to the south by Islais Creek, and to the east by the Bay. The Plan area encompasses approximately 350 acres along San Francisco's eastern shoreline. The Plan provides a blueprint for ensuring that new growth is coordinated in a way that creates a robust urban neighborhood and supports the area's role in the city as a whole. The

Plan includes the following elements: land use, parks and open spaces, historic preservation, moving about, and urban design. The Plan was prepared in December 2002 and was released for public review and comment in January 2003. It has not been formally adopted by the City.

The provisions of the City's General Plan and the draft Central Waterfront Neighborhood Plan that are applicable to the project and visual resources are summarized and evaluated in Table 8.11-4.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan and the Draft Central Waterfront Neighborhood Plan

Provision	Discussion of Project's Conformity to Provision
Urban Design Element	
Image and Character Policy 1.1 Recognize and protect major views in the city, with particular attention to those of open space and water.	Implementation of the project will not adversely affect views of open space and the Bay.
Image and Character Policy 1.3 Recognize that buildings, when seen together, produce a total effect that characterizes the city and its districts.	The new buildings will result in a landscape that is both consistent and compatible with the surrounding industrial development.
Richness of Past Development Policy 2.4 Preserve notable landmarks and areas of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with past development.	No landmarks or areas of historic, architectural, or aesthetic value currently exist on the project site, therefore, project development at the site will have no effect on the City's intent to promote preservation of historic buildings or features.
Richness of Past Development Policy 2.6 Respect the character of older development nearby in the design of new buildings.	The new buildings to be constructed as part of the project at the project site will not detract from the character of other buildings located nearby.
Richness of Past Development Policy 2.7 Recognize and protect outstanding and unique areas that contribute in an extraordinary degree to San Francisco's visual form and character.	Implementation of the project will not affect areas in San Francisco that are determined to be outstanding and unique, including views of the Bay.
Visual Harmony Policy 3.1 Promote harmony in the visual relationships and transitions between new and older buildings.	The new buildings to be constructed as part of the project at the project site will not affect the visual harmony of the other buildings located nearby. The proposed site layout distributes the buildings in the southern half of the project site for project operational efficiency.
Visual Harmony Policy 3.2 Avoid extreme contrasts in color, shape, and other characteristics, which will cause new buildings to stand out in excess of their public importance.	The colors proposed to be used for project features will be shades of gray that are standard colors for electrical generation equipment. This would enable the project features to blend with other structures nearby and the Bay, when viewed from the west.
Visual Harmony Policy 3.3 Promote efforts to achieve high quality of design for buildings to be constructed at prominent locations.	The quality of design of the new project buildings will be typical of that required for power plants. The project site is not considered a "prominent" location within the city, and its design will not limit the design quality of other buildings at prominent locations.
Height and Bulk Policy 3.4 Promote building forms that will respect and improve the integrity of open spaces and other public areas. New buildings should not block significant views of public open spaces, especially large parks and the Bay. Buildings near these	Implementation of the project will not adversely affect views of the Bay. Project development will result in the conversion of 4 acres of open space land to an industrial (power plant) use. However, this conversion of land use will result in a landscape that is in context with and is compatible with the other industrial uses in the area.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan and the Draft Central Waterfront Neighborhood Plan

Provision	Discussion of Project's Conformity to Provision
open spaces should permit visual access, and in some cases physical access, to them.	
Height and Bulk Policy 3.5 Relate the height of buildings to important attributes of the city pattern and to the height and character of existing development.	The heights of the structures associated with the project will be compatible with the heights of the existing structures on the project site and on the adjacent sites.
Height and Bulk Policy 3.6 Relate the bulk of buildings to the prevailing scale of development to avoid an overwhelming or dominating appearance in new construction.	The bulk of the structures associated with the project will be compatible with the bulk of the structures on the adjacent sites.
Visual Amenity Policy 4.12 Install, promote and maintain landscaping in public and private areas.	This policy is not applicable to the project site because the project site is not a public area, and it is not appropriate to have landscaping within a power plant site.
Visual Amenity Policy 4.14 Remove and obscure distracting and cluttering elements.	Development of the project at the site will require the removal of an existing cement plant, thus removing the only manmade development at the site.
Environmental Protection Element	
Land Policy 7.2 Protect land from changes that would make it unsafe or unsightly. The discussion focuses on excavation of land for off-site use of the removed material, and discourages unnecessary excavation.	Implementation of the project will improve the visual condition of the site by eliminating the weeds and removing the cement plant from the site. Development of the site into a power plant will result in a landscape that appears orderly. Although construction of the project may involve some excavation at the project site, the land surface at the site will be contoured to near existing elevations, therefore, significant amounts of excavated material are not expected to be transported offsite and such excavation will not be considered unsightly.
Commerce and Industry Element	
General/Citywide Policy 1.2 Assure that all commercial and industrial uses meet minimum, reasonable performance standards. A critical aspect of development management is to mitigate negative impacts created by new development: economic, aesthetic, physical, environmental, and social. To ensure that commercial and industrial activities do not detract from the environment in which they locate, and may in fact benefit their surroundings, performance standards should be applied in evaluating new developments. The policies of the Master Plan provide many of the standards to be used in evaluating development proposals. Other standards are found in various city ordinances and state and federal laws. As necessary, these standards should be reformed and additional standards developed.	The Applicant will comply with San Francisco's policies presented in its General Plan, the Planning Code, other local planning documents, and applicable state and federal laws, ordinances, regulations, and standards addressing visual resources.
Central Waterfront Area Plan	
Land Use Policy 1.3 Promote new development which has minimal adverse environmental consequences. Assure that the adverse environmental impacts of new	The Applicant has provided mitigation measures to assure minimization of project impacts.

TABLE 8.11-4
Conformity of the San Francisco Electric Reliability Project with the San Francisco General Plan and the Draft Central Waterfront Neighborhood Plan

Provision	Discussion of Project's Conformity to Provision
development are mitigated to the maximum feasible extent.	
Urban Design Policy 10.1 Reinforce the visual contrast between the waterfront and hills by limiting the height of structures near the shoreline. Relate the height and bulk of new structures away from the shoreline to the character of the topography and existing development.	The heights and bulk of the structures associated with the project will be compatible with the heights and bulk of existing structures on the project site and on the adjacent sites.
Urban Design Policy 10.2 Protect and create views of the downtown skyline and the Bay. Design and locate new development to minimize obstruction of existing views.	Implementation of the project will not affect views of the downtown area of the city, nor will it adversely affect views of the Bay.
Urban Design Policy 10.3 Encourage the rehabilitation of architecturally or historically significant buildings with reuse potential.	There are no buildings currently at the project site. Project implementation will have no effect on rehabilitation of architecturally or historically significant buildings.
Central Basin Subarea Policy 18.1 Minimize blockage of private and public views and maintain, to the extent feasible, sightlines from Potrero Hill to the waterfront and downtown.	Implementation of the project will not affect views of the downtown area of the city, nor would it adversely affect views of the Bay.
South Bayshore Area Plan	
Urban Design Policy 10.2 Improve the visual quality and strengthen the pedestrian orientation of the Third Street core area.	Implementation of the proposed project near the Illinois Street/25th Street intersection will have no effect on the visual quality along Third Street.
Recreation and Open Space Policy 13.1 Assure that new development adjacent to the shoreline capitalizes on the unique waterfront location by improving the visual and physical access to the water in conformance with urban design policies.	The proposed project will not be developed adjacent to the Bay shoreline. Implementation of the proposed project would have no effect on the visual and physical access to the Bay
Central Waterfront Neighborhood Plan (Draft for Public Review)	
Historic Preservation Objective 1 Preserve notable landmarks in the Central Waterfront of historic, architectural, or aesthetic value, and promote the preservation of other buildings and features that provide continuity with the past.	No landmarks or areas of historic, architectural, or aesthetic value currently exist on the project site, therefore, project development at the site will have no effect on the City's intent to promote preservation of historic buildings or features.
Policy 1 Adopt height limits, based on the above objectives (listed in the Plan), that maximize housing opportunities and encouraging high-quality commercial spaces while producing buildings compatible with the neighborhood's character. The existing and proposed building height limits in the Plan for the project site are 65 feet.	All project buildings and other features (except for the three exhaust stacks) will be less than 65 feet tall. The three stacks would be approximately 85 feet tall, which will be in character with other industrial facilities located nearby.

Source: City and County of San Francisco, 1995, 1997a, 1997b, 1998b, 1998c, and 2002.

8.11.7.3 San Francisco Planning Code

The San Francisco Zoning Map (1999a) indicates that the area that includes the project site is designated M-2 (Heavy Industrial) by the City and County of San Francisco. The M-2 District is the least restrictive district regarding use. This district is located at the eastern edge of the City, separated from areas that are designated for residential and commercial uses. The heavier industries are permitted, with fewer requirements as to screening and enclosure than in the M-1 District. Many of these uses are permitted only as conditional uses or at a considerable distance from Residential Districts, which are located west of I-280 and Highway 101. The closest residences (worker lofts) to the project site are located on Minnesota Street near 25th Street, approximately 1,600 feet west of the project site.

The provisions of the Code that are applicable to the project and visual resources are summarized in Table 8.11-5.

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Article 1.2 Dimensions, Areas, and Open Spaces	
Section 122 Height and Bulk Limitations Buildings and structures shall be subject to the height and bulk limits established by Article 2.5 of this Code for use districts and for height and bulk districts.	See discussion below for individual sections (Sections 260(a)(3), 260(b)(2)(M), 270(a), and 270(b)) listed under Article 2.5 Height and Bulk Districts.
Section 141 Screening of Rooftop Features R, NC, C, M, SPD, RSD, SLR, SLI AND SSO Districts In R, SPD, RSD, NC, C, M, SLR, SLI and SSO Districts, rooftop mechanical equipment and appurtenances to be used in the operation or maintenance of a building shall be arranged so as not to be visible from any point at or below the roof level of the subject building. This requirement shall apply in construction of new buildings, and in any alteration of mechanical systems of existing buildings that results in significant changes in such rooftop equipment and appurtenances. The features so regulated shall in all cases be either enclosed by outer building walls or parapets, or grouped and screened in a suitable manner, or designed in themselves so that they are balanced and integrated with respect to the design of the building. Minor features not exceeding one foot in height shall be exempted from this regulation.	The Applicant does not intend to arrange mechanical equipment or appurtenances on the roofs of buildings.
Article 2.5 Height and Bulk Districts	
Section 260(a)(3) Height Limits: Measurement Method of Measurement. The limits upon the height of buildings and structures shall be as specified on the Zoning Map. In the measurement of height for purposes of such limits, the following rules shall be applicable: (3) In cases where the height limit is 65 feet or less and a street from which height measurements are made slopes laterally along the lot, or the ground slopes laterally on a lot that also slopes upward from the street, there shall be a maximum width for the portion of the building or structure that may be measured from a single point at curb or ground level, according to the definition of "height," as specified in the following table. These requirements shall not apply to any property to which the bulk limitations in Section 270 of this Code are applicable.	As indicated in this Section, the height limits do not apply to a property to which the bulk limitations in Section 270 apply.

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Section 260(b)(2)(M) Height Measurement on Lateral Slopes Where Height Limit is 65 Feet or Less Exemptions. In addition to other height exceptions permitted by this Code, the features listed in this Subsection shall be exempt from the height limits established by this Code, in an amount up to but not exceeding that which is specified. The following features shall be exempt, without regard to their horizontal area, provided the limitations for each are observed: (M) Structures and equipment necessary for the operation of industrial plants, transportation facilities, public utilities and government installations, where otherwise permitted by this Code and where such structures and equipment do not contain separate floors, not including towers and antennae for transmission, reception, or relay of radio, television, or other signals where permitted as principal or conditional uses by this Code.	As indicated by this Section, the proposed project is exempt from height limits.
Section 270(a) Bulk Limits: Measurement The limits upon the bulk of buildings and structures shall be as stated in this Section and in Sections 271 and 272. The terms "height," "plan dimensions," "length" and "diagonal dimensions" shall be as defined in this Code. In each height and bulk district, the maximum plan dimensions shall be as specified in Table 270 Bulk Limits, at all horizontal cross-sections above the height indicated.	Noted. As indicated by Section 270(b) below, the bulk limits stated in this Section are superceded and do not apply to the project.
Section 270(b) Bulk Limits: Measurement These limits shall not apply to the buildings, structures and equipment listed in Section 260(b)(2)(K), (L), (M), and (N) of this Code, subject to the limitations expressed therein.	Noted. Section 260(b)(2)(M) Height Measurement on Lateral Slopes Where Height Limit is 65 Feet or Less is applicable to the proposed project (and is discussed above), therefore, the project is not subject to bulk limitations.
Article 6 Signs	
Section 607 Commercial and Industrial Districts Signs in C and M Districts, other than those signs exempted by Section 603 of this Code, shall conform to the following provisions: (a) General Advertising Signs. No general advertising sign shall be permitted in any C-1 District or within 200 feet of the park known as Union Square and visible from said park, except that a replacement sign of the same size or smaller, of the same type as defined in this Code or as interpreted by the Zoning Administrator, and at the same approximate location as an existing sign would be allowed within 200 feet of said park provided that the sign is otherwise permitted by the Planning Code, would cast no additional shadow upon Union Square, has no intensification of lighting as determined by the Zoning Administrator, and is not internally lighted or backlighted. Use of neon is not precluded by this provision. Temporary general advertising signs determined by the Zoning Administrator to be at pedestrian level and less than 50 square feet in size are not precluded by this provision. (b) Roof Signs. Roof signs shall be permitted in all C and M Districts other than C-1 only if Subsections (1) through (3) below are satisfied; except that a roof sign that is designated historic pursuant to Sections 303 and 608.14 of this Code may be permitted without regard to Subsections (1) through (3) below:	

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
(1) The sign does not extend more than 25 feet above the roofline of the building on or over which the sign is placed; and	
(2) All parts of the sign are within 25 feet of, and the sign is mounted at not more than a 45-degree angle from, a wall of a building the roofline of which is at least as high as the top of the sign; and	
(3) Such wall forms a complete backdrop for the sign, as the sign is viewed from all points from which the sign is legible from a public street or alley.	
(c) Wind Signs. No wind sign shall be permitted in any C or M District.	
(d) Moving Parts. No sign shall have or consist of any moving, rotating, or otherwise physically animated part (as distinguished from lights that give the appearance of animation by flashing, blinking or fluctuating), except as follows:	
(1) Moving or rotating or otherwise physically animated parts may be used for the rotation of barber poles and the indication of time of day and temperature.	
(2) In the case of a general advertising sign in C-2, C-3, C-M, M-1 and M-2 Districts, except for signs located within 200 feet of the park known as Union Square and visible from said park and signs located so as to be primarily viewed by persons traveling on any portion of a freeway, moving or otherwise physically animated parts may be used if such parts do not exceed a velocity of one complete cycle in a four-second period where such parts constitute less than 30 percent of the area of the sign or if, where such parts constitute a greater area of the sign, they do not exceed a velocity of one complete cycle in a four-second period and are stationary at least half of each eight-second period; except that signs designated historic pursuant to Sections 303 and 608.14 of this Code may have such moving features otherwise prohibited for signs located so as to be primarily viewed by persons traveling on any portion of a freeway.	
(3) Notwithstanding the type of signs permissible under subparagraph (d), a video sign is prohibited.	
(4) Notwithstanding the type of signs permissible under subparagraph (d)(2), a sign that rotates is prohibited.	
(e) Illumination. Any sign may be nonilluminated or indirectly or directly illuminated. Signs in C-3, C-M, M-1 and M-2 Districts shall not be limited in any manner as to type of illumination, but no sign in a C-1 or C-2 District shall have or consist of any flashing, blinking, fluctuating or otherwise animated light except in each of the following special sign districts, all as specifically designated as "Special Districts for Sign Illumination" on Sectional Map SSD of the Zoning Map of the City and County of San Francisco, described in Section 608 of this Code:	
(1) In the C-2 area consisting of five blocks in the vicinity of Fisherman's Wharf;	
(2) In the C-2 area in the vicinity of Van Ness Avenue from Golden Gate Avenue and Eddy Street to Sacramento Street, and Polk Street from Eddy Street to Geary Street, also known as the Automotive Special Use District;	
(3) In the C-2 area in the vicinity of Stockton, Washington and Kearny Streets and Broadway, also known as Washington-Broadway	

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
Special Use District Number 1.	
(4) Notwithstanding the type of signs permissible under subparagraph (e), a video sign is prohibited in the districts described in subparagraphs (1)-(3).	
(f) Projection. No sign shall project more than 75 percent of the horizontal distance from the street property line to the curbline and in no case shall a sign project more than 10 feet beyond the street property line or building setback line in C-1 Districts, or 12 feet beyond the street property line or building setback line in any other C or M District.	
(g) Height and Extension Above Roofline.	
(1) Signs Attached to Buildings. Except as provided in Section 260 for historic signs in historic districts, no sign attached to a building shall extend or be located above the roofline of the building to which it is attached; except that up to ½ the area of a business sign attached to the street wall of a building may extend above the roofline, up to the maximum height permitted for freestanding signs in the same district or 10 feet above the roofline, whichever is the lesser. In addition, no sign attached to a building shall under any circumstances exceed the following maximum heights:	
In C-1: 40 feet;	
In C-3: 100 feet;	
In all other C and M Districts: 60 feet.	
The 100-foot height limitation stated herein shall not apply to the modification or replacement of any currently existing wall signs so long as such modified or replacement sign is generally in the same location and not larger in surface area and projection than existing signs being modified or replaced. Such signs may contain letters, numbers, a logo, service mark and/or trademark and may be nonilluminated or indirectly illuminated.	
(2) Freestanding Signs. The maximum height for freestanding signs shall be as follows:	The Applicant will comply with this provision by ensuring that the proposed sign will be less than 40 feet tall.
In C-1: 24 feet;	
In C-2: 36 feet;	
In all other C and M Districts: 40 feet.	

TABLE 8.11-5
Conformity of the San Francisco Electric Reliability Project with the San Francisco Planning Code

Provision	Discussion of Project's Conformity to Provision
(h) Special Standards for Automobile Service Stations. For automobile service stations, only the following signs are permitted, subject to the standards in this Subsection (h) and to all other standards in this Section 607.	
(1) A maximum of two oil company signs, which shall not extend more than 10 feet above the roofline if attached to a building, or exceed the maximum height permitted for freestanding signs in the same district if freestanding. The area of any such sign shall not exceed 180 square feet, and along each street frontage all parts of such a sign or signs that are within 10 feet of the street property line shall not exceed 80 square feet in area. No such sign shall project more than five feet beyond any street property line or building setback line. The areas of other permanent and temporary signs as covered in Paragraph 607(h)(2) below shall not be included in the calculation of the areas specified in this paragraph.	
(2) Other permanent and temporary business signs, not to exceed 30 square feet in area for each such sign or a total of 180 square feet for all such signs on the premises. No such sign shall extend above the roofline if attached to a building, or in any case project beyond any street property line or building setback line.	
(3) General advertising signs meeting the provisions of this Section 607.	

Source: City and County of San Francisco, 1999b.

8.11.7.4 Port of San Francisco Waterfront Land Use Plan and the Port of San Francisco Waterfront Design & Access

The project site is located along the west side of the Bay within the Southern Waterfront sub-area of the Port of San Francisco Waterfront Land Use Plan. The Plan includes seven goals. Relevant to visual resources is one goal.

The policies of the Port Plan and Waterfront Design & Access Element that are applicable to the project and visual resources are summarized and evaluated in Table 8.11-6.

TABLE 8.11-6
Conformity of the San Francisco Electric Reliability Project with the Port of San Francisco Waterfront Land Use Plan and the Waterfront Design & Access Element

Provision	Discussion of Project's Conformity to Provision
Port of San Francisco Waterfront Land Use Plan	
Urban Design Worthy of the Waterfront Setting	
The design of new developments should be of exemplary quality and should highlight visual and physical access to and from the Bay, while respecting the waterfront's rich historic context and the character of neighboring development. Objectives include: Maintain existing building height and bulk limitations and encourage building designs that step down to the shoreline.	The quality of design of the new project buildings would be typical of that required for power plants. Project implementation will not change the visual or physical access to and from the Bay that is currently experienced, nor will its implementation affect the preservation of historic resources in the area. Heights of project structures will be in context with existing development in the area.

TABLE 8.11-6
Conformity of the San Francisco Electric Reliability Project with the Port of San Francisco Waterfront Land Use Plan and the Waterfront Design & Access Element

Provision	Discussion of Project's Conformity to Provision
Encourage more physical connections between the land and the water throughout the waterfront.	
Improve views of the working waterfront from all perspectives.	
Protect and frame near and distant views to and from the Bay, particularly along major City streets.	
Identify significant bulkhead and other historic resources that should be preserved.	
Remove certain piers between Pier 35 and China Basin to create Open Water Basins and to improve Bay views.	
Port of San Francisco Waterfront Design & Access Element	
View Policy – View Sites Establish new views at specific points or areas that afford exceptional views of the Bay and waterfront.	Implementation of the project will not interfere with the City's intent to provide exceptional views of the Bay and waterfront.
View Policy – Street Views Streets connecting to the waterfront should have views of the Bay, historic structures, or architecture that provides a waterfront identity.	Implementation of the project will have no effect on the City's ability to provide views of the Bay, historic structures, or architecture from streets that connect to the waterfront.
View Policy – View Intervals Provide views of the Bay and maritime activities at frequent intervals along the Embarcadero Promenade.	Implementation of the project will have no effect on the City's ability to provide such views along the Embarcadero Promenade.

Source: Port of San Francisco and San Francisco Planning Department, 2000.

8.11.7.5 Scenic Roadway Programs

This section discusses the California State Scenic Highway Program and the 49-Mile Scenic Drive in San Francisco, and the project's potential effects on those scenic road systems.

In 1963, the State Legislature established the California Scenic Highway Program. The goal of the California Scenic Highway Program is to preserve and enhance the natural beauty of California. Caltrans maintains the system of designated and eligible scenic highways, with the intent of recognizing and protecting the more scenic corridors along the state highway system. The Bay Bridge (Interstate-80 [I-80]) and I-280 near the project site are eligible for scenic highway designation; however, these segments have not been officially designated. The eligible section of I-80 in San Francisco extends from I-280 near First Street in San Francisco to Route 61 in Oakland. The eligible section of I-280 extends from SR 17 in Santa Clara County to I-80 near First Street in San Francisco (Caltrans, 2003). Protection of scenic qualities along designated scenic highways is the responsibility of the local agency. No local agency has applied to Caltrans to designate I-280 near the project site as a state scenic highway; therefore, no specific policies have been implemented to protect scenic qualities in this corridor. No significant long-term impact on the landscape along I-280 is expected as a result of implementation of the project.

The 49-Mile Scenic Drive in San Francisco was first introduced in 1938. The route is a complete loop of the City that passes by San Francisco's scenic attractions and historic highlights. It passes through the project vicinity (along Indiana Street and I-280). The Scenic Drive is a well-known and frequently traveled tourist route, and for the most part, is not a state eligible or designated scenic highway. Certain roadway segments of the Scenic Drive are regulated through the City and County Planning Code; the segments of the Scenic Drive along Indiana Street and I-280 that are in the project vicinity are not specified in the Planning Code. No significant long-term impact on the landscape along the 49-Mile Scenic Drive is expected as a result of project implementation.

8.11.7.6 Summary of Project's Conformity with Applicable LORS

The project is consistent with applicable laws, ordinances, regulations, and standards related to visual resource issues.

8.11.7.7 Other Plans that were Reviewed

Other plans that were reviewed for applicability to the project and visual resources included the following:

- **The San Francisco Bay Area Seaport Plan (1997)**: The Plan designates areas determined to be necessary for future port development as *port priority use areas* (areas to be reserved for port-related and other uses that will not impede development of the sites for port purposes). The project site is located within a Port priority use area; however, no policies applicable to visual resources are provided in the Plan. Therefore, no further discussion of the Plan is provided.

- **The San Francisco Bay Plan (2003):** The Plan has jurisdiction over the San Francisco Bay and a shoreline band consisting of all territory located between the shoreline of San Francisco Bay and 100 feet landward. The project site is located approximately 200 feet from the shoreline at its closest point (northeast corner of the project site), therefore, the Bay Plan is not applicable to the project, and no further discussion of the Bay Plan is provided.

8.11.8 References

Buhyoff, G. J., P. A. Miller, J. W. Roach, D. Zhou, and L. G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. AI Applications. Vol. 8, No. 1., pp. 1-13.

California Department of Transportation (Caltrans). 2003. Caltrans Scenic Highway Guidelines. http://www.dot.ca.gov/hq/LandArch/scenic/shpg1.htm. Accessed on December 15, 2003.

City and County of San Francisco (CCSF). 2002. The Central Waterfront Neighborhood Plan. Draft for Public Review. December 2002.

City and County of San Francisco (CCSF). 1999a. Zoning Map of the City and County of San Francisco. Sheet 8. San Francisco Municipal Code Part II, Chapter II, Section 209 with amendments to 8 including July 1999.

City and County of San Francisco (CCSF). 1999b. San Francisco Planning Code.

City and County of San Francisco (CCSF). 1998a. San Francisco General Plan. Recreation and Open Space Element. As amended through January 5, 1998.

City and County of San Francisco (CCSF). 1998b. San Francisco General Plan. Central Waterfront Area Plan. As amended through January 5, 1998.

City and County of San Francisco (CCSF). 1998c. San Francisco General Plan. Commerce and Industry Element. As amended through January 15, 1998.

City and County of San Francisco (CCSF). 1997a. San Francisco General Plan. Urban Design Element. As amended through June 26, 1997.

City and County of San Francisco (CCSF). 1997b. San Francisco General Plan. South Bayshore Area Plan. As amended through June 3, 1997.

City and County of San Francisco (CCSF). 1995. San Francisco General Plan. Environmental Protection Element. As amended through August 17, 1995.

Port of San Francisco and San Francisco Planning Department. 2002. Port of San Francisco Waterfront Land Use Plan. Adopted by the Port Commission, Resolution No. 97-50, June 1997. Includes amendments through October 2001. Republished version October 2002.

Port of San Francisco and San Francisco Planning Department. 2000. Port of San Francisco Waterfront Design & Access, an Element Of The Waterfront Land Use Plan. Adopted by the Port Commission, June 24, 1997. Includes amendments through July 2000.

San Francisco Bay Conservation and Development Commission (BCDC). 2003. San Francisco Bay Plan. Plan adopted 1968; as amended through June 2003.

San Francisco Bay Conservation and Development Commission and the Metropolitan Transportation Commission. 1997. *San Francisco Bay Area Seaport Plan*. Plan dated 1996; as amended September 18, 1997.

U.S. Department of Agriculture (USDA) Forest Service. 1973. *National Forest Landscape Management Volume 1*. Washington D.C.: Superintendent of Documents.

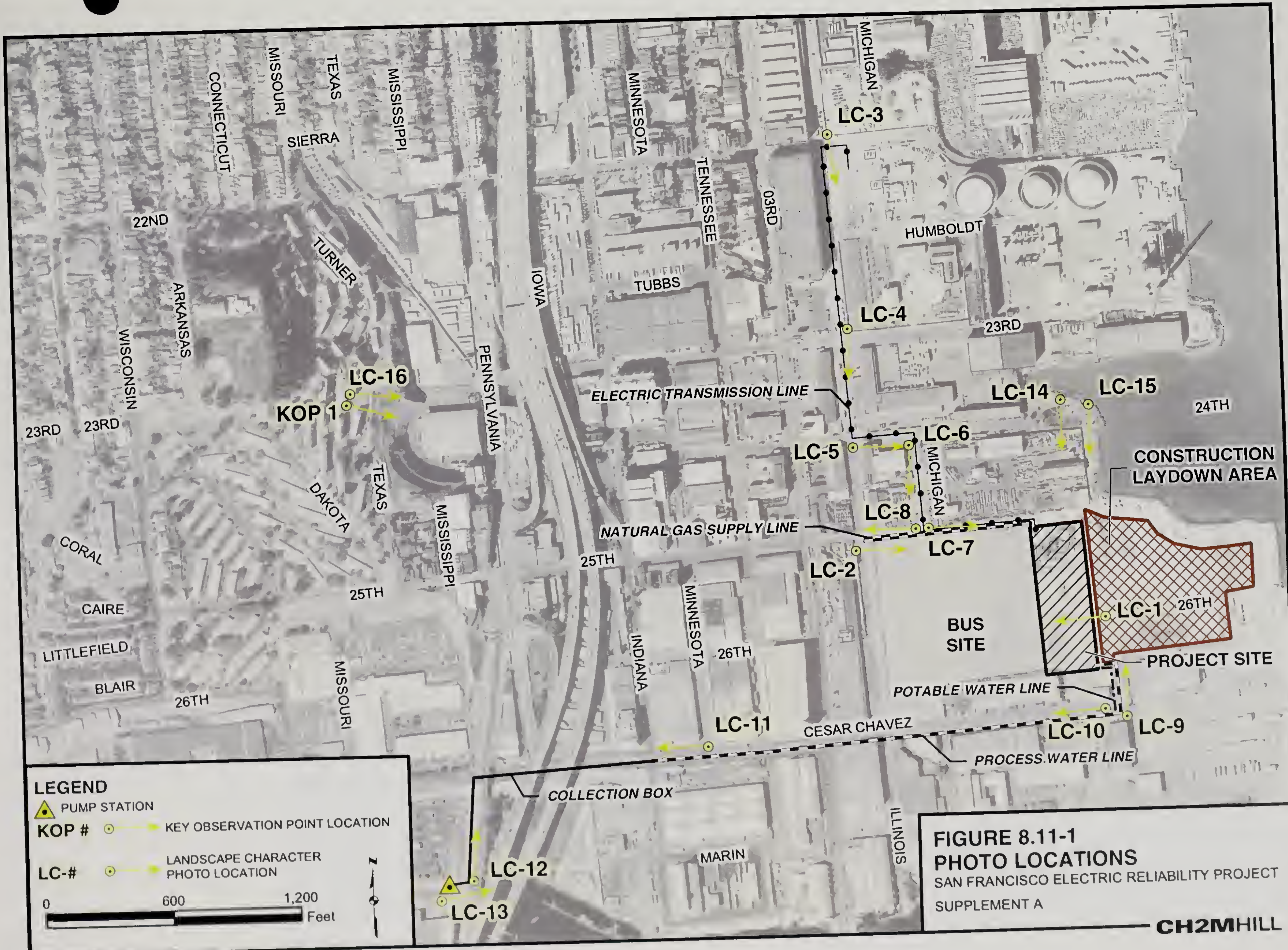


FIGURE 8.11-1
PHOTO LOCATIONS
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

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LC-1: Looking west at the project site from the construction laydown area located immediately to the east of the project site.

LC-2: Looking east toward the project site from the Illinois Street/25th Street intersection. The site proposed for the MUNI development is in the foreground, and the project site is located in the distance (where the cement facilities are shown to the left of the light pole that is to the left of photo center).

FIGURE 8.11-2
LANDSCAPE CHARACTER OF
THE PROJECT SITE (PHOTOS LC-1 AND LC-2)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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LC-3: Looking south toward the existing switchyard located at the southeast corner of the Illinois Street/22nd Street intersection. This is the terminus of the proposed underground electric transmission line.

LC-4: Looking south along Illinois Street from the 23rd Street intersection. The proposed underground transmission line would be aligned along this portion of Illinois Street.

FIGURE 8.11-3
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-3 AND LC-4)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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LC-5: Looking east along 24th Street from the Illinois Street intersection. The proposed underground transmission line would be aligned along this portion of 24th Street.

LC-6: Looking south along Michigan Street from the 24th Street intersection. The proposed underground transmission line would be aligned along this portion of Michigan Street.

FIGURE 8.11-4
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-5 AND LC-6)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

LC-7: Looking east along 25th Street from the Michigan Street intersection. The proposed underground transmission line and the proposed gas line would be aligned along this portion of 25th Street (a gravel road), and would terminate at the project site, located toward the right side of the photo in the distance. This portion of 25th Street is a private road that provides access to a cement company facility that is located on the project site (it would be removed prior to project construction).

LC-8: Looking west along 25th Street from the Michigan Street intersection. The proposed gas line would be aligned along this portion of 25th Street.

FIGURE 8.11-5
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-7 AND LC-8)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

LC-9: Looking north along an unsigned street from Cesar Chavez Street toward the terminus of the proposed process water line and the proposed potable water line at the project site. The Port of San Francisco is shown toward the right side of the photo. Cesar Chavez Street is in the foreground.

LC-10: Looking west along Cesar Chavez Street from the Port of San Francisco. The proposed process water line would be aligned along this portion of Cesar Chavez Street.

FIGURE 8.11-6
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-9 AND LC-10)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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LC-11: Looking west along Cesar Chavez Street from Minnesota Street. An elevated I-280 is shown in the photo. The proposed process water line would be aligned along this portion of Cesar Chavez Street.

LC-12: Looking northwest along the alignment of the proposed process water line at the eastern end of Marin Street.

FIGURE 8.11-7
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-11 AND LC-12)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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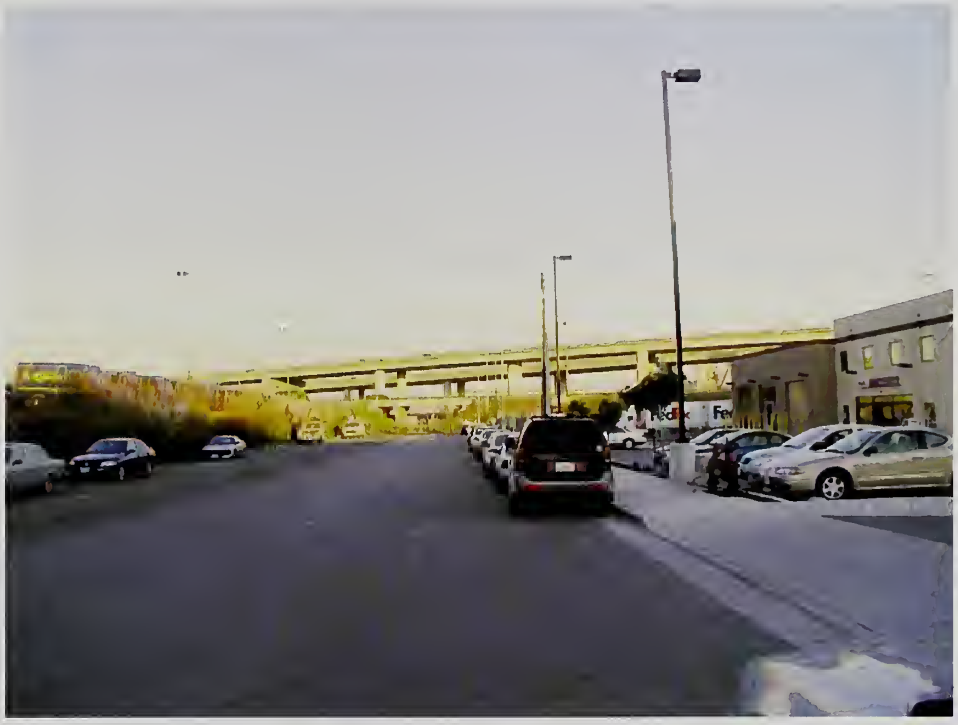
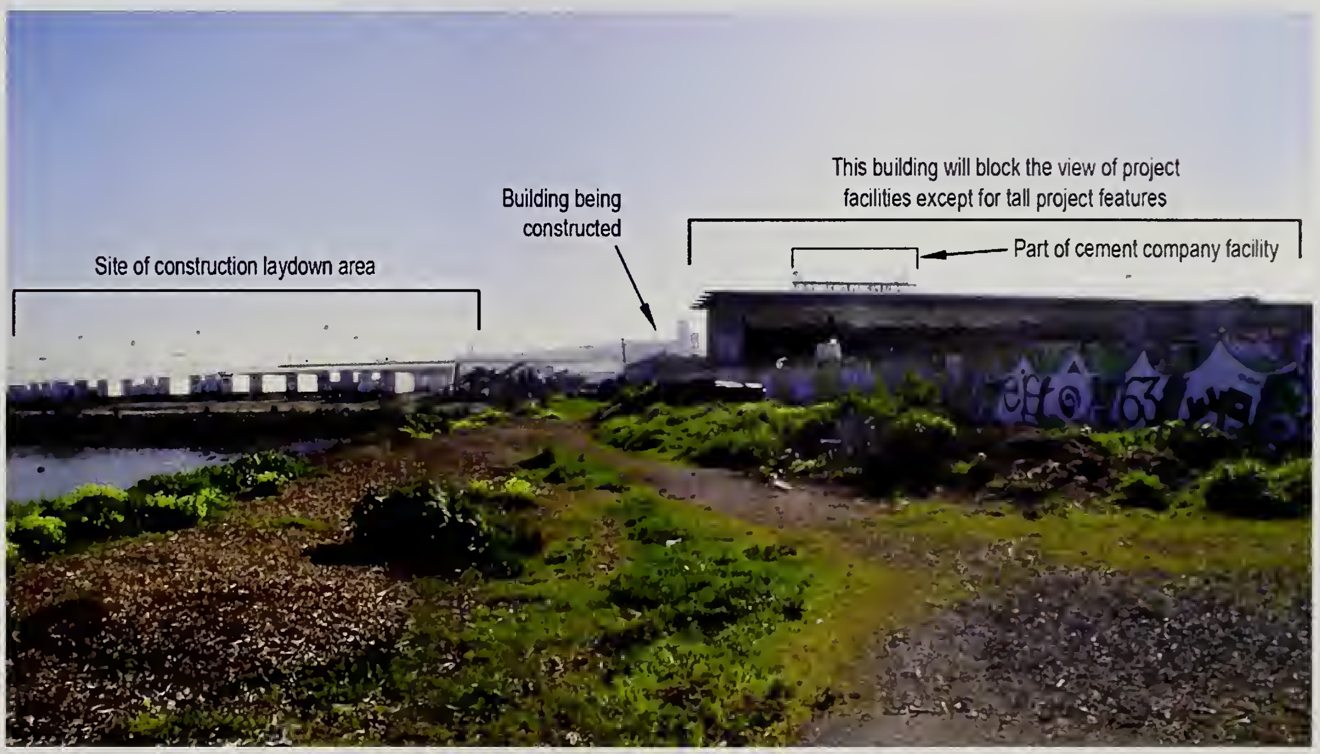


LC-13: Looking east along Marin Street toward its dead-end. This is the western terminus of the proposed process water line.

FIGURE 8.11-8
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTO LC-13)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

LC-14: A view of Warm Water Cove Park, looking south from the northern edge of the park. The park is located at the eastern dead-end of 24th Street.



LC-15: Looking south from Warm Water Cove Park toward the project site.

FIGURE 8.11-9
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTOS LC-14 AND LC-15)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

LC-16: The view looking east from Potrero Hill reside

FIGURE 8.11-10
LANDSCAPE CHARACTER IN
THE PROJECT VICINITY (PHOTO LC-16)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

CH2MHILL

LC-16: The view looking east from Potrero Hill residences. This is the view from Watchman Way, near the location where the KOP 1 photo was taken.

FIGURE 8.11-10
LANDSCAPE CHARACTER IN THE PROJECT VICINITY (PHOTO LC-16)
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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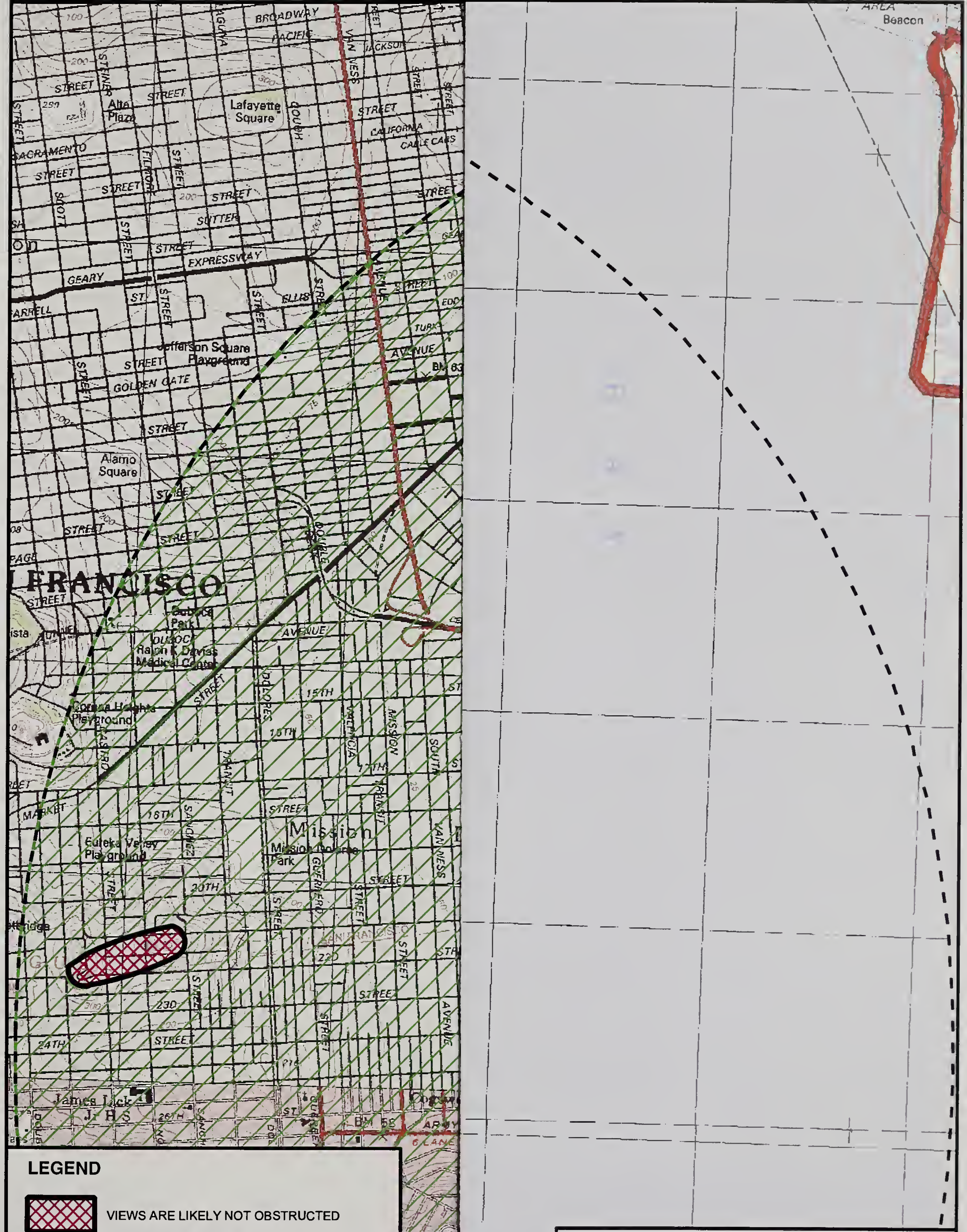
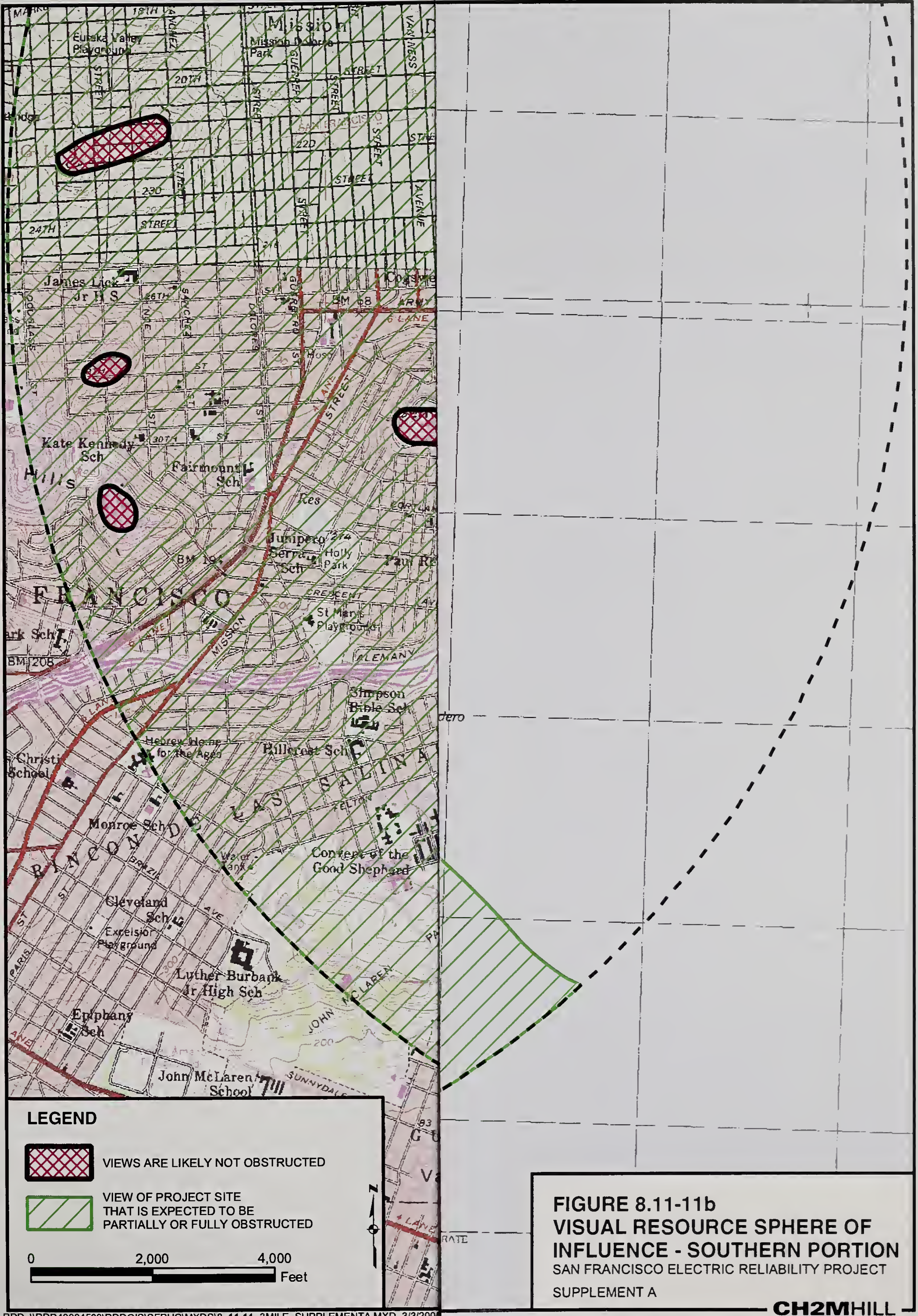


FIGURE 8.11-11a
VISUAL RESOURCE SPHERE OF INFLUENCE - NORTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

FIGURE 8.11-11a
VISUAL RESOURCE SPHERE OF INFLUENCE - NORTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A



LEGEND

VIEWS ARE LIKELY NOT OBSTRUCTED

VIEW OF PROJECT SITE THAT IS EXPECTED TO BE PARTIALLY OR FULLY OBSTRUCTED

0 2,000 4,000 Feet

N

FIGURE 8.11-11b
VISUAL RESOURCE SPHERE OF INFLUENCE - SOUTHERN PORTION

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

SUPPLEMENT A

CH2MHILL

FIGURE 8.11-11b
VISUAL RESOURCE SPHERE OF INFLUENCE - SOUTHERN PORTION
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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KOP 1: Simulated view of the project site from Watchman Way residences.

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FIGURE 8.11-12b
KOP 1: SIMULATED VIEW OF THE PROJECT AND MUNI FACILITY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
CH2MHILL

KOP 1: Existing view of the project site from Watchman Way residences.

FIGURE 8.11-12a
KOP 1: EXISTING VIEW OF THE PROJECT SITE
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

KOP 1: Simulated view of the project site from Watchman Way residences.

FIGURE 8.11-12b
KOP 1: SIMULATED VIEW OF THE PROJECT AND MUNI FACILITY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
CH2MHILL

KOP 1: Simulated view of the MUNI Facility from Watchman Way residences.

FIGURE 8.11-12c
KOP 1: SIMULATED VIEW OF THE MUNI FACILITY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT

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SUBSECTION 8.12

Hazardous Materials Handling

8.12 Hazardous Materials Handling

8.12.1 Introduction

This subsection evaluates the potential effects on human health and the environment from the storage and use of hazardous materials in conjunction with the proposed San Francisco Electric Reliability Project (SFERP). Subsection 8.12.2 presents the laws, ordinances, regulations, and standards (LORS) applicable to hazardous materials; Subsection 8.12.3 describes the existing environment that may be affected, and Subsection 8.12.4 identifies potential impacts on the environment and on human health from site development. Subsection 8.12.5 discusses the offsite migration modeling. Subsection 8.12.6 discusses fire and explosion risk. Subsection 8.12.7 addresses potential cumulative impacts, Subsection 8.12.8 presents proposed mitigation measures, and Subsection 8.12.9 describes the agencies involved and provides agency contacts. Subsection 8.12.10 describes permits required and the permit schedule. Subsection 8.12.11 provides the references used to develop this section. Hazardous waste management, including handling of potentially contaminated soil and groundwater, is addressed in Subsection 8.13, Waste Management.

Most of the hazardous materials that will be used for the project are required for treatment and laboratory analysis of the cooling water, facility maintenance, wastewater treatment, and lubrication of equipment or will be contained within transformers and electrical switches. The project will comply with applicable laws and regulations for the storage of these materials to minimize the potential for a release of hazardous materials and will conduct emergency response planning to address public health concerns regarding hazardous materials storage.

Onsite storage of aqueous ammonia, required for the control of oxides of nitrogen emissions, presents the greatest potential public health risk due to the chemical properties of ammonia. However, the project includes specific design features (described in Subsection 8.12.4.2), that will control the extent of a gaseous release in the event of a catastrophic spill of ammonia. In addition, an offsite consequence analysis conducted for the project indicates that in the unlikely event of a catastrophic release, gaseous ammonia concentrations would not exceed 5 parts per million (ppm) beyond the property boundary to the north, south, or east. The 5 ppm level is well below the California Energy Commission's [CEC's] significance level of 75ppm, and constitutes the odor threshold for ammonia. To the west, gaseous ammonia concentrations would exceed 2000 ppm, approximately 35 feet onto the proposed MUNI Maintenance and Operations Center which is not accessible to the public. The portion of the MUNI Maintenance Operations Center to be impacted will be a railcar storage yard. Since the ammonia plume would not extend into a publicly accessible area, the storage of ammonia at the proposed project site will not present an unacceptable public health risk. The project will install ammonia sensors to activate audible alarms and flashing lights to alert MUNI and SFERP personnel that a spill has occurred. The Applicant will also work with the proposed MUNI Maintenance and Operations Center to determine other appropriate means to notify MUNI employees should there be a release and proper response in the event of a spill, including notification of hazardous response team(s). (See also the offsite consequence analysis in Subsection 8.12-5.)

The Applicant will prepare and maintain a risk management plan (RMP), described in Subsection 8.12.8.2.2, addressing the potential effects of an accidental release, a program for preventing a release, and emergency response procedures in the event of a release. The plan will be submitted to the San Francisco Department of Public Health and distributed to other agencies including the San Francisco Fire Department, which will be responsible for assisting plant personnel in the event of a chemical emergency. Preparation and implementation of the RMP will further reduce the public health risks associated with the storage of ammonia at the SFERP.

8.12.2 Laws, Ordinances, Regulations, and Standards

The storage and use of hazardous materials and regulated substances at the facility are governed by federal, state, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and to protect facility workers and the surrounding community from exposure to hazardous and regulated substances. The applicable LORS are summarized in Table 8.12-1 and described below.

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Federal		
CERCLA/SARA/EPCRA		
Section 302, EPCRA (Pub. L. 99–499, 42 USC 11022) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires one time notification if extremely hazardous substances are stored in excess of TPQs. The facility will have ammonia in concentrations greater than 20 percent and in excess of the threshold quantity of 20,000 pounds.	An HMBP and an RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.2).
Section 304, EPCRA (Pub. L. 99–499, 42 USC 11002) Emergency Planning And Notification (40 CFR 355)	Requires notification when there is a release of hazardous material in excess of its RQ.	An HMBP will be prepared to describe notification and reporting procedures (Subsection 8.12.8.2.1).
Section 311, EPCRA (Pub. L. 99–499, 42 USC 11021) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.	The HMBP to be prepared will include a list of hazardous materials for submission to agencies (Subsection 8.12.8.2.1).
Section 313, EPCRA (Pub. L. 99–499, 42 USC 11023) Toxic Chemical Release Reporting: Community Right-To-Know (40 CFR 372)	Requires annual reporting of releases of hazardous materials.	The HMBP to be prepared will describe reporting procedures (Subsection 8.12.8.2.1).

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Section 112, Clean Air Act Amendments (Pub. L. 101–549, 42 USC 7412) Chemical Accident Prevention Provisions (40 CFR 68)	Requires facilities that store a listed hazardous material at a quantity greater than the TQ to develop a Risk Management Plan. The facility will have ammonia in concentrations greater than 20 percent and in excess of the threshold quantity of 20,000 pounds.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.2).
Section 311, Clean Water Act (Pub. L. 92–500, 33 USC 1251 et seq.) Oil Pollution Prevention (40 CFR 112)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC will be prepared (Subsection 8.12.8.2.3).
Pipeline Safety Laws (49 USC 60101 et seq.) Hazardous Materials Transportation Laws (49 USC 5101 et seq.) Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (49 CFR 192)	Specifies natural gas pipeline construction, safety, and transportation requirements.	The natural gas pipeline will be constructed in accordance with 49 CFR requirements (Subsection 8.12.6).
California		
Health and Safety Code, Section 25500, et seq. (HMBP)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities.	An HMBP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.6.2).
Health and Safety Code, Section 25531 through 25543.4 (CalARP)	Requires registration with local CUPA or lead agency and preparation of an RMP if regulated substances are handled or stored in excess of TPQs.	An RMP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.6.2).
Health and Safety Code, Section 25270 through 25270.13 (Aboveground Petroleum Storage Act)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC plan will be prepared (Subsection 8.12.6.2.3).
Health and Safety Code, Section 25249.5 through 25249.13 (Safe Drinking Water and Toxics Enforcement Act) (Proposition 65)	Requires warning to persons exposed to a list of carcinogenic and reproductive toxins and protection of drinking water from same toxins.	The site will be appropriately labeled for chemicals on the Proposition 65 list. (Subsection 8.12.2.4)

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
California Public Utilities Commission (CPUC) General Order Nos. 112-E and 58-A	Specify standards for gas service and construction of gas gathering, transmission, and distribution piping systems.	Construction of the natural gas pipeline will comply with the standards specified in these General Orders (Subsection 8.12.6).
Local		
San Francisco Public Health Code, Article 21	Requires preparation of a Hazardous Materials Certificate of Registration and Hazardous Materials Business Plan for storage of hazardous materials.	A Hazardous Materials Certificate of Registration and HMBP will be prepared for submittal to the San Francisco Department of Public Health (Subsection 8.12.8.2.1).
San Francisco Public Health Code, Article 21A	Requires preparation of a Risk Management Plan for regulated substances.	An RMP will be prepared for submittal to the San Francisco Department of Public Health. RMP will be prepared using the San Francisco Department of Public Health's Regulated Substance Program Guidance Document for Preparation of a RMP (Subsection 8.12.8.2.2).
San Francisco Fire Code	Requires proper storage and handling of hazardous materials.	San Francisco Fire Code will be followed for design and construction of the hazardous materials handling facilities (Subsection 8.12.8.2.1).

Notes:

Cal ARP	California Accidental Release Program
CAA	Clean Air Act [Amendments]
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
CUPA	Certified Unified Program Agency
EHS	extremely hazardous substance
EPCRA	Emergency Planning and Community Right-to-Know Act
HMBP	Hazardous Materials Business Plan
LEPC	local emergency planning committee
MSDS	Material Safety Data Sheet
Pub. L.	Public Law
RMP	Risk Management Plan
RQ	Reportable Quantity
SARA	Superfund Amendments and Reauthorization Act
SERC	state emergency response commission
SPCC	Spill Prevention Control and Countermeasure Plan
TPQ	Threshold Planning Quantity
TQ	Threshold Quantity
USC	United States Code

8.12.2.1 Federal

Hazardous materials are governed under the Comprehensive Environmental Response and Liability Act (CERCLA), the Clean Air Act (CAA), and the Clean Water Act (CWA).

8.12.2.1.1 CERCLA. The Superfund Amendments and Reauthorization Act (SARA) amends CERCLA and governs hazardous substances. The applicable part of SARA for the proposed project is Title III, otherwise known as the Emergency Planning and Community

Right-To-Know Act of 1986 (EPCRA). Title III requires states to establish a process for developing local chemical emergency preparedness programs and to receive and disseminate information on hazardous substances present at facilities in local communities. The law provides primarily for planning, reporting, and notification concerning hazardous substances. Key sections of the law are:

- Section 302—Requires one time notification when extremely hazardous substances (EHSs) are present in excess of their threshold planning quantities (TPQs). EHSs and their TPQs are found in Appendices A and B to 40 Code of Federal Regulations (CFR) Part 355.
- Section 304—Requires immediate notification to the local emergency planning committee (LEPC) and the state emergency response commission (SERC) when a hazardous material is released in excess of its reportable quantity (RQ). If a CERCLA-listed hazardous substance RQ is released, notification must also be given to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notifications given to the local emergency response team or fire personnel.
- Section 311—Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.
- Section 313—Requires annual reporting of hazardous materials released into the environment either routinely or as a result of an accident.

8.12.2.1.2 Clean Air Act. Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store a Threshold Quantity (TQ) or greater of listed regulated substances to develop a Risk Management Plan (RMP), including hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130. Aqueous ammonia is a listed substance and its TQ for solutions of 20 percent and greater is 20,000 pounds of solution.

8.12.2.1.3 Clean Water Act. The Spill Prevention, Control, and Countermeasures (SPCC) program under the CWA is designed to prevent or contain the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Regulations (40 CFR 112) under the CWA require facilities to prepare a written SPCC Plan if they store oil and its release would pose a threat to navigable waters. The SPCC program is applicable if a facility has a single oil aboveground storage tank (AST) with a capacity greater than 660 gallons, total petroleum storage (including ASTs, oil-filled equipment and drums) greater than 1,320 gallons, or underground storage capacity greater than 42,000 gallons.

Other related federal laws that address hazardous materials but do not specifically address their handling, are the Resource Conservation and Recovery Act (RCRA), which is discussed in Section 8.13, Waste Management, and the Occupational Safety and Health Act, which is discussed in Section 8.7, Worker Health and Safety.

8.12.2.1.4 Natural Gas Pipeline Construction and Safety. Title 40 of the Code of Federal Regulations, parts 190 through 192, specifies safety and construction requirements for natural gas pipelines. Part 190 outlines pipeline safety procedures, Part 191 requires a

written report for any reportable incident, and Part 192 specifies minimum safety requirements for pipelines.

8.12.2.2 State

California laws and regulations relevant to hazardous materials handling at the facility include Health and Safety Code Section 25500 (hazardous materials), Health and Safety Code 25531 (regulated substances), and the Aboveground Petroleum Storage Act (petroleum in aboveground tanks).

8.12.2.2.1 Health and Safety Code Section 25500. California Health and Safety Code, Section 25500, et seq., and the related regulations in 19 California Code of Regulations (CCR) 2620, et seq., require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit a Hazardous Materials Business Plan (HMBP) to their local Certified Unified Program Agency (CUPA) and to report releases to their CUPA and the State Office of Emergency Services. The threshold quantities for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

8.12.2.2.2 Health and Safety Code Section 25531 (California Accidental Release Program). California Health and Safety Code, Section 25531, et seq., and the California Accidental Release Program (CalARP) regulate the registration and handling of regulated substances. Regulated substances are any chemicals designated as an extremely hazardous substance by the U. S. Environmental Protection Agency (USEPA) as part of its implementation of Superfund Amendments and Reauthorization Act (SARA) Title III. Health and Safety Code Section 25531 overlaps or duplicates some of the requirements of SARA and the CAA. Facilities handling or storing regulated substances at or above TPQs must register with their local CUPA and prepare an RMP, formerly known as a Risk Management and Prevention Program (RMPP). The CalARP is found in Title 19, CCR, Chapter 4.5. The TPQ for ammonia is 500 pounds. Portions of the aqueous ammonia process that can be demonstrated to have a partial pressure of the regulated substance in the mixture (solution), under the handling or storage conditions, which is less than 10 millimeters of mercury (mm Hg) do not count toward the threshold.

8.12.2.2.3 Aboveground Petroleum Storage Act. Health and Safety Code Sections 25270 to 25270.13 ensure compliance with the federal CWA. The law applies to facilities that operate a petroleum AST with a capacity greater than 660 gallons or combined ASTs capacity greater than 1,320 gallons or oil-filled equipment where there is a reasonable possibility that the tank(s) or equipment may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands. If a facility falls under these criteria, it must prepare a SPCC plan.

8.12.2.2.4 Safe Drinking Water and Toxics Enforcement Act (Proposition 65). This law identifies chemicals that cause cancer and reproductive toxicity, provides information for the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by California's Office of Environmental Health Hazard Assessment. Some of the chemicals to be used at the facility are on the cancer-causing and reproductive-toxicity lists of the Act.

The City of San Francisco is not subject to Proposition 65, based on the definition of person[1] in the Prop 65 law. Since the SFERP facility will be maintained and operated by the City, the SFERP facility is not subject to Proposition 65.

8.12.2.2.5 Natural Gas Pipeline Construction and Safety. The California Public Utilities Commission enforces General Order No. 58-A specifying standards for natural gas service in the State of California, and General Order No. 112-E specifying rules governing the design, construction, testing, operation, and maintenance of natural gas gathering, transmission, and distribution piping systems.

8.12.2.3 Local

The City and County of San Francisco (CCSF) has responsibility for administering hazardous materials requirements and ensuring compliance with federal and state laws in San Francisco.

8.12.2.3.1 Hazardous Materials Storage and Handling. The requirements for hazardous materials handling are specified in the San Francisco Public Health Code, enforced by the San Francisco Department of Public Health (SFDPH), Environmental Health Section. Article 21 incorporates the California Underground Storage Tank Regulations (California H&S Code, Chapters 6.7 and 6.75), Hazardous Materials Release Response Plans and Inventory Regulations requiring preparation of a Hazardous Materials Business Plan (HMBP) (California H&S Code, Chapter 6.95, Article 1), Aboveground Petroleum Storage Tank Regulations requiring preparation of a SPCC plan (California H&S Code, Section 25270.5), and hazardous materials management provisions of the Uniform Fire Code requiring Hazardous Materials Inventories (Uniform Fire Code, Sections 8001.3.2[a] and 8001.3.3[a]). It also provides for additional stricter local requirements. Article 21 also requires conformance with applicable hazardous materials requirements of the San Francisco Building Code, Electric Code, Public Works Code, Fire Code and City Planning Code. Article 80 of the San Francisco Fire Code incorporates the hazardous materials handling requirements of the Uniform Fire Code, discussed below, and is enforced by the San Francisco Fire Department.

8.12.2.3.2 Regulated Substances Handling. The requirements for handling of regulated substances, including the preparation of an RMP, are specified in Article 22A of the San Francisco Public Health Code, enforced by the SFDPH. This article incorporates the requirements of CalARP, described above.

8.12.2.4 Codes

The design, engineering, and construction of hazardous materials storage and dispensing systems will be in accordance with all applicable codes and standards, including the following:

- California Vehicle Code, 13 CCR 1160, et seq.—Provides the California Highway Patrol (CHP) with authority to adopt regulations for the transportation of hazardous materials in California.
- The California Fire Code, Articles 79 and 80—The hazardous materials sections of the Fire Code. Local fire agencies or departments enforce this code and can require that an HMBP and a Hazardous Materials Inventory Statement be prepared. This requirement

[1] Section 25249.11(b) of Proposition 65 exempts Cities and Counties from the definition of a person.

and the requirement for an HMBP can usually be satisfied in a single combined document. San Francisco adopted these articles of the California Fire Code into its municipal code in 1999. The California Fire Code is based on the Federal Fire Code.

- State Building Standard Code, Health and Safety Code Sections 18901 to 18949—Incorporates the UBC, Uniform Fire Code, and Uniform Plumbing Code.
- The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII.
- The American National Standards Institute (ANSI) K61.1.

8.12.3 Affected Environment

The project site is located in the City of San Francisco, adjacent to San Francisco Bay (see Figure 2-1). Land use in the surrounding area (discussed in detail in Subsection 8.4, Land Use) is primarily industrial and commercial with some associated residential. Sensitive receptors within a 3-mile radius of the project site include 233 schools and day care facilities, 221 churches, 15 hospitals and 32 Senior care facilities, and 57 parks and recreation centers. These receptors are listed in Table 8.12-2 and shown on Figure 8.6-1. The closest of these receptors is the Warm Water Cove Public Access area, a park located approximately 700 feet northeast of the project site. The nearest school is Starr King Elementary School located approximately 2845 feet to the west. The nearest day care facility is Cleo Wallace Child Growth Center located approximately 3528 feet to the northwest. The nearest hospital/long-term health care facility is the San Francisco General Hospital located approximately 5,937 feet to the west.

The nearest residence is located on the corner of Minnesota and 25th Street, approximately 1,632 feet west of the project site.

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

Schools and Daycare Facilities			
1	24th Street High Start	119	Love & Learn Nursery School
2	3n1 Preschool	120	Lucy Harber Academy
3	Academy of Art College	121	Luther Burbank Middle School
4	Adda Clevenger Jr Preparatory	122	M & J Daycare
5	After School Enrichment Program	123	Malcolm X Academy Elementary School
6	After Six High School	124	Marin Day School
7	Alemany Campus	125	Marin Day School
8	Alvarado Elementary School 420	126	Marin Day School
9	American College of Early	127	Marin Day Schools
10	Angel Childcare For Infants	128	Marin Day Schools
11	Aria School For Exceptional Children	129	Marin Day Schools
12	Bay View Daycare	130	Marshall Academic High School
13	Bayview Academy	131	Marshall Elementary School

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

14	Bessie Carmichael Elementary School	132	Martin Luther King Middle School
15	Big City Montessori School	133	McKinley Elementary School
16	Bret Harte Elementary School	134	M'Eadd Preparatory Day Care
17	Bret Harte Pre-K School	135	Meadows Livingstone School
18	Bridgemont High school	136	Mission Child Care Center
19	Bridgeview Daycare	137	Mission Child Development Center
20	Bryant Child Development Center	138	Mission Dolores Elementary School
21	Bryant Elementary School	139	Mission Education Center
22	Buen Dia Family School	140	Mission Head Start-673 Valencia St
23	Buena Vista Alternative Elementary / Child Care	141	Mission Head Start-3543 18th St.
24	Burnett Children Center	142	Mission High School-3141 26th St
25	Burnett Nursery & School-Age	143	Mission Neighborhood Ctr-152 Berry St
26	California College Arts Crafts	144	Mission Neighborhood Ctr-673 Valencia St
27	California Institute of integral Studies	145	Mission Neighborhood Ctr-3141 26th St
28	Capp Center Head Start	146	Mission Neighborhood Waldorf School
29	Cathedral School for Boys	147	Monroe Elementary School
30	Cesar Chavez Prekindergarten	148	Montessori House of Children
31	Charles R Drew Nursery	149	Mountain Crest Academy
32	Chavez Elementary School	150	Munchkinland-Child Care
33	Child Field Day Care	151	New College of California
34	Children's Day School	152	Noe Valley Nursery School
35	Children's Village	153	Notre Dame des Victories School
36	Chinese American International School	154	Open Mind
37	Chinese Central High school	156	Open Mind School
38	Chinese Education Center	157	Our Lady of the Visitation School
39	City College of San Francisco	158	Pacific Gas Children's Ctr
40	Cleo Wallace Child Growth Center	159	Parkview Place Children's Center
41	Cleveland Elementary School	160	Paul Revere Elementary School
42	Companeros Del Barrio Pre School	161	Paul Revere Annex Elementary School
43	Cornerstone Academy	162	Peace Site Academy Elementary
44	Cornerstone Academy	163	Peppertree Day Care & Program
45	Corpus Christi School	164	Philip and Sala Burton High School
46	Creative Arts Charter School	165	Phoebe Hearst Preschool Center
47	Cross Cultural Family Center	166	Potrero Hill Middle School
48	Cross Cultural Family Center	167	Preschool
49	Cumberland Chinese School	168	Rise Institute
50	CW's Child Care Service	169	Rocky Mountain Participation

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

51	Cyo Mission Day Care	170	Rooftop Alternative Elem School
52	Daniel Webster Elementary School	171	Roof Top K8th School
53	Delta Preschool	172	Rose Parks Elementary School
54	Downtown Continuation High School	173	SF Cares
55	Dr. Charles R Drew Elementary	174	Sacred Heart Catholic Prep School
56	Eben Ezer Family Day Care	175	Sacred Heart Grammar School
57	Edison Charter Academy	176	San Francisco Community
58	Edward R Taylor Elementary / Pre K School	177	San Francisco City College
59	El Dorado Elementary School	178	San Francisco Friends School
60	Enola D Maxwell Middle School	179	San Francisco Head Start-824 Carolina St
61	Eureka Learning Center	180	San Francisco Head Start-125 W Point Rd
62	Evertt Middle School	181	San Francisco Law School
63	Excelsior Child Dev Center Monroe	182	San Francisco School
64	Fairmount Elementary School	183	San Francisco University Head Start
65	Family Development Center	184	San Francisco Unified School
66	Fellowship Academy & Pre-school	185	San Francisco Waldorf High
67	Filipino Immersion Program	186	San Francisco Waldorf High
68	First Baptist Church-International School	187	San Paths Academy
69	Flynn Elementary School	188	Sanchez Elementary School
70	Forest Hill Montessori School	189	Sanchez Pre-Kindergarten
71	Frandelja Enrichment	190	School-Applied Science & Technology
72	French-American International School	191	Seneca Center - San Francisco
73	Friends of Potrero Hill Nursery	192	Sojourner Truth Child Care Center
74	Friends of St Francis Child Care	193	Sr Martin College Preparatory
75	George R Moscone Elementary	194	St Anthony's Elementary/ Immaculate School
76	George Washington Carver Elementary School	195	St Charles Catholic School
77	Girls 2000	196	St Charles School
78	Glen Park Elementary School	197	St Elizabeth School
79	Glen Park Pre-School	198	St James Elementary School
80	Gloria B Davis Middle School	199	St John's School
81	Golden Gate University	200	St Nicholas Child Care Center
82	Gordon J Lau Elementary School	201	St Paul of Shipwreck School
83	Harriet Street Day Activity	202	St Paul's Elementary School
84	Harvey Milk Civil Rights Elementary School	203	St Paul's Intermediate School
85	Hastings College of the Law	204	St Peter School
86	Hayes Valley Site	205	St Philip's School
87	Head Start	206	Starr King Elementary School

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

88	Head Start	207	Stevenson Child Care Center
89	Heald Business College - SF	208	Stuart Hall High School
90	Healthy Environment	209	Synergy Elementary School
91	Hillcrest Elementary School	210	Tanisha's Daycare
92	Holy Family Day Home	211	Theresa S Mahler Child Dev Prg
93	Horace Mann Middle School	212	Thurgood Marshall High School
94	Ida B Wells-Mark Twain High School	213	Touro College
95	Ideal Daycare	214	Trevor Martin Montessori School
96	Immaculate Conception Academy	215	Trinity Business College
97	International Christian School	216	True Sunshine Preschool Ctr
98	International Studies Academy	217	Twelve Hugs Children's Center
99	James Lick Middle School	218	Twenty-First Century Academy
100	Jewish Community High School	219	UC-Hastings College of Law
101	John A O'Connell High school	220	Victoria's Family Daycare
102	John Muir Elementary / Pre-Kindergarten School	221	Visitacion Valley Middle School
103	John Swett Elementary School	222	Walden House School
104	Joshua Marie Cameron Academy	223	Walden School
105	Junipero Serra Elementary School	224	West Portal Care Inc. 65 Chenery St
106	Karen's Family Day Care	225	Whitney Young Child Day Center
107	Kate Kennedy Children's Center	226	World Academy of Keristan
108	Katherine Michiels School	227	Wu Yee Children's Service
109	Kiddieland Happy Face Place	228	Wu Yee Children's Service
110	La Mel Middle School	229	Yebra Buena Gardens Child Development
111	Las Americas Children Center	230	YMCA-4080 Mission St
112	Leadership Charter High School	231	YMCA of San Francisco-631 Howard St
113	Leaping For Joy License Child	232	Yoey Children Center
114	Leonard R Flynn Elementary	233	Youth Chance High School
115	Leonard R Flynn School-Age		
116	Little Bear School		
117	Littlest Angel Prep Preschool		
118	Live Oak School		
Hospitals			
1	Ca Pacific Medical Center	9	St. Luke's Hospital
2	Chinese Hospital	10	St. Luke's Hospital
3	David, Jeanne-Pacific Pediatrics Group Inc	11	St. Luke's Hospital
4	Davies Medical Center-San Francisco	12	St. Francis Memorial Hospital
5	Drumm Medical Center	13	Sutter Health Western Division

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

6	Ocadian Hospitals and Care Center	14	University-California Renal
7	San Francisco General Hospital	15	U.S. Veterans Center
8	Sheffield Convalescent Hospital		
Senior Centers			
1	American Filipino Senior Club	13	Network for Elders
2	Autumn Glow	18	New Leaf
3	Bayview Hunters Point Senior	19	Nob Hill Healthcare Center
4	Bayview Hunters Point Senior	20	Noe Valley Senior Center
5	Central Gardens Convalescent	21	On Lok 30th St Senior Service
6	Curry Senior Center	22	Philippines American Senior Center
7	Diamond Senior Center	223	Presentation Senior Community
8	Episcopal Sanctuary Canon Kip	24	San Francisco Adult Day Service
9	Fancis of Assisi Community	25	San Francisco Senior Center
10	Golden Gate for Seniors	26	San Francisco Towers
11	Hayes Convalescent Hospital	27	St Anthony Foundation
12	Hayes Valley Care	28	Sheffield Convalescent Hospital
13	Jewish Home for Aged Day Center	29	University Mound Ladies Home
14	Life Management Assoc.	30	Verne S Doxey Inc
15	Mendelsohn House	31	Visitation Valley Community Center
16	Mission Bay Convalescent Hospital	32	West Bay Philipino Senior Center
17	Neighborhood Elders Support		
Parks and Recreation Centers			
1	3COM Park	30	Folsom
2	Adams Rogers	31	John Maclaren
3	Alamo Square	32	Juri Street
4	Ampco System	33	Justin Herman Plaza
5	Bayview	34	Koshland
6	Bayview Play Ground	35	Margaret S Hayward Play Ground
7	Bernal Heights	36	Mckinley Square
8	Billy Goat Hill	37	Mission Dolores Park
9	Civic Center Plaza	38	Mission Playground
10	Corona Heights Playground	39	O'Farrell Street Park
11	Douglas Playground	40	Palega Recreation Center
12	Duboce	41	Portola Recreation Center
13	Esprit Park	42	Portsmouth Square
14	Eureka Valley Recreation Center	43	Postmouth Square
15	Fairmount Plaza	44	Potrero del Sol

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

16	Franklin Square Park	45	Potrero Hill Recreation Center
17	Garfield Square	46	Precita
18	George Christopher Playground	47	Rolph Play Ground
19	Gilman Playground Park	48	Saint Mary's
20	Hallidie Plaza	49	Silver Terrace Play Ground
21	Hayward Playground	50	South of Market Park
22	Heron's Head Park	51	South Park
23	Hilltop	52	Union Square Parks
24	Holly Park	53	Upper Noe Recreation Center
25	Indian Basin Shoreline Play Ground	54	Walter Hass Play Ground
26	Islais Creek Public Access Area	55	Warm Water Cove Public Access Area
27	Jackson Play Ground	56	Yerba Buena Gardens
28	Jefferson Square	57	Youngblood Coleman Play Ground
29	Potrero Hill Playground		
Churches			
1	Abundant Life Church of God	112	Korean First Presbyterian Church
2	Advent of Christ the King	113	Korean Presbyterian Church
3	African Orthodox Church	114	La Raza Community Resource Center
4	All Saints Church	115	Latvian Lutheran Church
5	Allen Chapel	116	Little Bethany Baptist Church
6	American Chinese Presbyterian	117	Lourdes Center
7	American Indian Baptist Church	118	Matthew Zion Baptist Church
8	Apostleship of the Sea	119	Metropolitan Baptist Church
9	Apostolic Church of the Faith	120	Mision Evangelica Peniel
10	Arc Apostolato Radio	121	Mission Bay Community Church
11	Arca De Dios Church	122	Mission Dolores Basilica
12	Archdiocese of San Francisco	123	Mission Korean Presbyterian
13	Ark of Refuge Inc	124	Most Holy Redeemer Church
14	Ascension Baptist Church	125	Mount Gilead Baptist Church
15	Baha'I Faith-San Francisco Center	126	Mt. Enon Baptist Church
16	Baptist Church Second Union	127	Mt. Trinity Baptist Church
17	Bayview Baptist Church	128	Neighborhood Baptist Church
18	Bayview Jehovah's Witnesses	129	New Antioch Baptist Church
19	Bayview Tabernacle Baptist Church	130	New Beginning Church of God
20	Bell Chapel Christian Methodist Church	131	New Home Missionary Baptist Church
21	Bethel Cathedral	132	New Hope Alliance Church
22	Bethel Christian Church	133	New Life Deliverance Center

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

23	Bethel Temple United Holy Church	134	Noe Valley Ministry
24	Calvary Apostolic Church	135	Notre Dame Des Victoires
25	Center for Young Woman Develop	136	Old St. Mary's Cathedral
26	Chabad of Noe Valley	137	Olivet Baptist Church
27	Children Evangelism Fellowship	138	Open Bible Church
28	Chinese Independent Baptist	139	Orthodox Catholic Church
29	Chinese United Methodist Church	140	Our Lady of Lourdes Church
30	Chozen-Ji Ca Betsuin Rinzai	141	Pathfinders Miss Baptist Church
31	Christ Missionary Baptist Church	142	Perszim Christian Liberty
32	Christian Science Church	143	Philadelphia Church of God
33	Christian Science Reading Room	144	Phioptochos Society Docese
34	Church of Christ	145	Portola Baptist Church
35	Church of God	146	Presbyterian Church-Chinatown
36	Church of God of Prophecy	147	Primera Lglesia Bautista Del
37	Church of Natural Grace	148	Promised Land Fellowship
38	Church of Scientology Mission	149	Providence Baptist Church
39	Church of St Gregory Nyssen	150	Rainbow Seventh-Day Adventist
40	Church of the Sojorners	151	Redeemer Community Church
41	Church-The Nativity-our Lord	152	Rigpa San Francisco Center
42	City of Refuge United Church	153	Roca De Salvacion
43	City View Church	154	Rock of Ages Church
44	Congregation Keneseth Israel	155	Russian Gospel Temple
45	Congregation Sherith Israel	156	SF Gospel Mission
46	Cornerstone Church	157	Sacred Heart Church
47	Corpus Christi Church	158	Salvation Army
48	Cornerstone Evangelical Baptist	159	Salvation Army Adult Rehab Center
49	Cornerstone Missionary Baptist	160	San Francisco Church of God
50	Cultural Integration Fellowship	161	San Francisco Friends Meeting
51	Cumberland Presbyterian Church	162	San Francisco Lighthouse
52	Double Rock Baptist Church	163	Second Union Baptist Church
53	Dolores Street Baptist Church	164	Seventh-Day Adventist Church
54	Ebenezer Baptist Church	165	Seventh-Day Adventist Tabernacle
55	El Bethel Baptist Church	166	Shilo Full Gospel Church
56	Emanuel Baptist Church	167	Soka Gakkai Intl USA
57	Encuentro Del Canto Popular	168	Spanish Speaking Baptist Church
58	Evergreen Baptist Church	169	St Anthony's Church
59	Faith Temple Church of God	170	St Boniface Church-Franciscans

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

60	First Baptist Church	171	St. Charles Church
61	First Chinese Baptist Church	172	St. Elizabeth's Church
62	First Chinese Southern Baptist	173	St. Francis Lutheran Church
63	First Church of God-Anderson	174	St. James Baptist. Church
64	First Congregational Church	175	St. James Catholic Church
65	First Friendship institutional	176	St. James Presbyterian Church
66	First Pentecostal Church-Jesus	177	St. John Missionary Baptist
67	First Russian Christian Moloka	178	St. John The Evangelist. Catholic
68	First Samoan Congregational	179	St. John The Evangelist. Episcopalian
69	First Togan Free Weslyan Church	180	St. Kevin's Church
70	First Union Baptist Church	181	St. Luke's Baptist. Church
71	Flower Hill Baptist Church	182	St. Mark's Institutional Baptist
72	Free Evangelic Church Full	183	St. Mary's Cathedral Assumption
73	Free Methodist Church	184	St. Mary's Catholic Church
74	Freedom in Christ Evangelical	185	St. Matthew Lutheran Church
75	Galilee Baptist Church	186	St. Patricks Church
76	Glide Memorial Methodist Church	187	St. Paul of the Shipwreck Church
77	Good Hope Baptist Church	188	St. Paul of the Shipwreck Church
78	Good Samaritan Church	189	St. Paul Tabernacle Baptist. Church
79	Good Samaritan Episcopal Church	190	St. Paul's Catholic Church
80	Good Shepherd Baptist Church	191	St. Peter's Catholic Church
81	Grace Fellowship Community Church	192	St. Peters Missionary Baptist
82	Greaer Life Ministeries	193	St. Peter's School Special Service
83	Great Shepherd Baptist Church	194	St. Phillips Church
84	Greater Gethsemane Cogic	195	St. Stephen Baptist. Church
85	Greater New Light Baptist Church	196	St. Teresa's Church
86	Greater New St John Missionary	197	Star of Hope Missionary Bapt
87	Greater Prosperity Missionary	198	Sufi Islamia Ruhaniat Society
88	Hamilton Square Baptist Church	199	Supreme Master Ching Hai Intl
89	Holiness Temple In Christ	200	Tabernacle of Faith Missionary
90	Holy Innocents Episcopal Church	201	Templo De La Fe Asamblea
91	Holy of Holliness	202	Templo El Calvario Assemblies
92	Hosea Channels of Blessing Church	203	Third Baptist Church
93	Hosea Channels of Blessing Church	204	Tree of Life Baptist Church
94	House of God in San Francisco	205	Tri-Unity Missionary Baptist
95	Igl. Bau Del Valle Baptist Church	206	True Hope Church-God In Christ
96	Iglesia De Dios Pentecostal	207	True Light Church of God

TABLE 8.12-2
Sensitive Land Uses Within 3 Miles of the Proposed Project

97	Iglesia Del Pacto Evangelico	208	Tsa Tsa Studio
98	Iglesia Fuente De Vida	209	Ukrainian Catholic Church
99	Iglesia No Temas Porque Yo	210	Ukrainian Orthodox Church
100	Iglesia Presbiteriana-Mission	211	Union Spring Baptist Church
101	Iglesia San Juan 14 6	212	United House-Prayer for All
102	Iglesia Sion	213	Valley Baptist Church
103	Immaculate Conception Church	214	Verbum Dei Missionary Fraternity
104	Immanuel Baptist Church	215	Victory Outreach
105	Indonesian Evangelical Church	216	Vietnamese Buddihist Assn of SF
106	Innerchange	217	Visitacion Chinese Baptist Church
107	International Christian School	218	Visitation Church
108	James Memorial Church of God	219	Voice of Christ Full Gospel
109	Jehovah's Witnesses	220	Zhou Yu Zhang
110	Jehovah's Witnesses	221	Zion Chapel Church of God
111	Jesus Cristo Es El Senor		

As discussed in Subsection 8.12.5, Offsite Migration Modeling, releases to the north, south, and eastern boundaries of the SFERP will not exceed a concentration of 5 ppm. The area potentially affected by any release of aqueous ammonia in excess of 2,000 ppm would not extend more than 35 feet westward from the tank, just over the project fence line onto the proposed MUNI Metro East Maintenance and Operations Center. This will affect only the proposed MUNI Maintenance and Operations Center which is inaccessible to the general public. Mitigation measures proposed by the Applicant to protect the health and safety of the MUNI employees is further discussed in Subsection 8.12.8.2.2. There are no schools, hospitals, day-care facilities, emergency response facilities or long-term health care facilities located within the area potentially affected by any release of hazardous materials. (See the figure required by CEC Siting Regulations, Title 20, Division 2, Chapter 5, Appendix B (g) (10) (B), Figure 8.6-1, which shows the project site and surrounding area on a map at a scale 1:24,000.)

8.12.4 Potential Environmental and Human Health Effects

Construction and operation of the project will involve the use of various hazardous materials and one regulated substance. The potential environmental and human health impacts related to the use of these materials are discussed in this section.

8.12.4.1 Construction Phase

The quantities of hazardous materials that will be onsite during construction are small relative to the quantities used during operation. They will be limited to gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to vehicle fuels and oils for

operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and by the manufacturers' requirements for coating.

Use of these materials during construction will not present a public health risk because the use would be subject to the requirements of Article 21 of the San Francisco Health Code, described further in Subsection 8.12.8.2.1, and because there is a negligible chance that surface water or groundwater could be affected. As explained in more detail in Subsection 8.14, Water Resources, stormwater discharges from the construction site would be subject to the requirements of the City's permit and must be in compliance with the nine minimum controls described in the Federal Combined Sewer Overflow Control Policy (CSO Policy) and specified in the City's NPDES permit.

The project site is also subject to the "Risk Management Plan and Site Management Plan" (RMP/SMP) for the MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility (AGS, Inc., 2000). Section 5.0 of the RMP/SMP describes risk management measures required during development, including specific dust control measures, health and safety planning requirements, and measures minimizing workers' exposure to soil and groundwater. Section 8.0 of the RMP/SMP specifies additional site management requirements during construction, including dewatering controls, equipment decontamination, soil management protocols, and standards for imported soil. Further discussion about the RMP/SMP may also be found in Section 8.13, Waste Management.

Through compliance with these requirements, potential environmental effects from the use of hazardous materials during construction are less than significant. In addition, the hazardous materials used during construction will be registered with the SFDPH in accordance with Article 21 of the San Francisco Public Health Code if threshold quantities of storage are exceeded.

Regulated substances, as defined in California's Health and Safety Code, Section 25531, will not be used during construction of the project. Therefore, no discussion of regulated substances storage or handling is included in this subsection.

8.12.4.2 Operations Phase

Storage locations for the hazardous materials that will be used during operation are described in Table 8.12-3. Table 8.12-4 presents information about these materials, including trade names, chemical names, Chemical Abstract Service (CAS) numbers, maximum quantities onsite, RQs, CalARP TPQs, and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 8.12-5, which also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia).

A maximum of approximately 38,815 gallons and 100 pounds of hazardous materials and regulated substances will be stored for the project. Most of the hazardous substances that will be used by the project are required for treatment and laboratory analysis of the cooling water, facility maintenance, and lubrication of equipment, or will be contained within transformers and electrical switches. The only regulated substance that will be used for the project is aqueous ammonia; toxicity characteristics and the exposure level criteria for

TABLE 8.12-3
Storage Location and Use of Hazardous Materials During Project Operation

Chemical	Use	Storage Location	State	Type of Storage
Aqueous Ammonia (29% NH_3 by weight)	Control oxides of nitrogen (NO_x) emissions as part of selective catalytic reduction system	West side adjacent to chillers	Liquid	Continuously Onsite
Aluminum Sulfate, Sodium Aluminate	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Antiscalant*	Prevent scale in reverse osmosis membranes	Water treatment building	Liquid	Continuously Onsite
Citric Acid (50%)	pH control of upstream of reverse osmosis equipment	Wastewater Treatment building	Liquid	Continuously Onsite
Cleaning Chemicals/Detergents	Periodic cleaning	Shop/warehouse area	Liquid	Continuously Onsite
Coagulant Aid Polymer (e.g., NALCO NALCOLYTE 8799)*	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Corrosion Inhibitor (NALCO 8305 Plus)*	Cooling tower cooling water corrosion inhibitor	Near chiller cooling tower	Liquid	Continuously Onsite
Dispersant (NALCO TRASAR 23263)*	Cooling tower cooling water dispersant	Near chiller cooling tower	Liquid	Continuously Onsite
Ferric Chloride or Ferric Sulfate	Coagulant for plant makeup water	Water treatment building	Liquid	Continuously Onsite
Laboratory Reagents	Water/wastewater laboratory analysis	Water treatment building	Liquid and Granular Solid	Continuously Onsite
Synthetic Turbine Lubricating Oil	Lubricate rotating equipment (e.g., gas turbine lube oil systems)	Contained within storage tanks on equipment skids	Liquid	Continuously Onsite
Mineral Generator Lubricating Oil	Lubricate rotating equipment (e.g., generator lube oil systems)	Contained within storage tanks on equipment skids	Liquid	Continuously Onsite
Mineral Transformer Insulating Oil	Transformers/switchyard	Contained within transformers and electrical switches	Liquid	Continuously Onsite
Scale Inhibitors (Polyacrylate)	Cooling tower scale inhibitor	Near chiller cooling towers	Liquid	Continuously Onsite

TABLE 8.12-3
Storage Location and Use of Hazardous Materials During Project Operation

Chemical	Use	Storage Location	State	Type of Storage
Sodium Bisulfite (38-70%, NALCO 7804)	Remove free chlorine in reclaimed water upstream of reverse osmosis system and wastewater treatment	Water treatment building and wastewater treatment building	Liquid	Continuously Onsite
Sodium Bromide (NALCO STABREX ST40)	Cooling tower biocide and process water pretreatment	Near chiller cooling towers and water treatment building	Liquid	Continuously Onsite
Sodium Hydroxide (50% Caustic)	pH control upstream of reverse osmosis equipment and wastewater treatment	Water treatment building and wastewater treatment building	Liquid	Continuously Onsite
Sodium Hypochlorite (10.3 - 12% NaOHCl)	Biocide to treat inlet reclaimed water/ cooling tower biocide and process water pretreatment /and wastewater treatment	Water treatment building/ near chiller cooling tower/ wastewater treatment building	Liquid	Continuously Onsite
Sulfuric Acid (93 - 98%)	Enhance back flush of ultra filter system/ cooling tower cooling water pH control	Water treatment building/ near chiller cooling tower	Liquid	Continuously Onsite

Note:

* MSDS for these chemicals are available in Appendix 8.12B

TABLE 8.12-4
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Regulated Substances							
Aqueous Ammonia (29% solution)	Ammonium Hydroxide	1336-21-6 (for NH_3–H_2O)	10,000 gal.	100 lb	500 lb	500 lb	No
Hazardous Materials							
Aluminum Sulfate[d]	Aluminum Sulfate	10043-01-3	800 gal.	5,000 lb	5,000 lb	[e]	No
Sodium Aluminate[d]	Sodium Aluminate	1302-42-7	400 gal.	[e]	[e]	[e]	No
Antiscalant	Anti-scalant	None	200 gal.	[e]	[e]	[e]	No
Citric Acid	Citric Acid (50 percent)	77-92-9	100 gal.	[e]	[e]	[e]	No
Cleaning Chemicals/Detergents	Various	None	20 gal.	[e]	[e]	[e]	No
Coagulant Aid Polymer (e.g. NALCO NALCOLYTE 8799)	Sodium Chloride Polyquaternary Amine	7647-14-5 20507700000-5062P	400 gal.	[e] [e]	[e] [e]	[e] [e]	No
Corrosion Inhibitor (NALCO 8305 Plus)	Cooling tower cooling water corrosion inhibitor	None	200 gal.	[e]	[e]	[e]	No
Dispersant (NALCO TRASAR 23263)	Cooling tower cooling water dispersant	64665-57-2	200 gal.	[e]	[e]	[e]	No
Ferric Chloride[d]	Ferric Chloride	7705-08-0	400 gal.	1,000 lb	1,000 lb	[e]	No
Ferric Sulfate[d]	Ferric Sulfate	10028-22-5	400 gal.	1,000 lb	1,000 lb	[e]	No
Laboratory Reagents (liquid)	Various	None	20 gal.	[e]	[e]	[e]	No
Laboratory Reagents (solid)	Various	None	100 lb	[e]	[e]	[e]	No
Synthetic Turbine Lubrication Oil	Oil	None	560 gal.	42 gal.[f]	[g]	[e]	Yes
Mineral Generator Lubrication Oil	Oil	None	1,570 gal.	42 gal.[f]	[g]	[e]	Yes

TABLE 8.12-4
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Mineral Transformer Insulating Oil	Oil	8012-95-1	21,000 gal.	42 gal.[f]	[g]	[e]	Yes
Scale Inhibitors (various)	Polyacrylate	Various	400 gal.	[e]	[e]	[e]	No
Sodium Bisulfite (NALCO 7804)	Sodium Bisulfite (38 to 70 percent)	7631-90-5	450 gal.	5,000 lb	7,143 lb	[e]	No
Sodium Bromide (NALCO STABREX ST40)	Sodium Hydroxide (1 to 5 percent)	1310-73-2	200 gal.	1,000 lb	20,000 lb	[e]	No
Sodium hydroxide (caustic)	Sodium Hydroxide (50 percent)	1310-73-2	425 gal.	1,000 lb	20,000 lb	[e]	No
Sodium Hypochlorite (Bleach)	Sodium Hypochlorite (10.3-12 percent)	7681-52-9	400 gal.	100 lb	1,000 lb	[e]	No
Sulfuric Acid	Sulfuric Acid (93 – 98 percent)	7664-93-0	400 gal.	1,000 lb	1,075 lb	[e]	No

[a] Reportable quantity for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [Ref. 40 CFR 302, Table 302.4]. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

[b] Reportable quantity for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of a reportable chemical, the reportable quantity of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lb, the reportable quantity for that material would be (100 lb)/(10%) = 1,000 lb.

[c] Threshold Planning Quantity [Ref. 40 CFR Part 355, Appendix A]. If quantities of extremely hazardous materials equal to or greater than TPQ are handled or stored, they must be registered with the local Administering Agency.

[d] Some of the chemicals have alternatives (See Table 8.12-1), thus the maximum quantity stored onsite can be zero if an alternative chemical is being used.

[e] No reporting requirement. Chemical has no listed RQ or TPQ.

[f] State reportable quantity for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)].

[g] Per the California Regional Water Quality Control Board, Region 2, they would like all oil spills to surface water reported, even for less than the state reportable quantity of 42 gal.

TABLE 8.12-5
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Regulated Substances				
Aqueous Ammonia	Liquid, vapor is colorless gas with pungent odor	Corrosive: Irritation to permanent damage from inhalation, ingestion, and skin contact	Acids, halogens (e.g., chlorine), strong oxidizers, salts of silver and zinc	Liquid is incombustible; vapor is combustible, but difficult to burn
Hazardous Materials				
Aluminum Sulfate	Liquid	Toxic: Moderately toxic by ingestion	None	Nonflammable
Sodium Aluminate	Straw-colored liquid	Strong irritant to tissue	Acids and strong oxidizing agents	Nonflammable
Antiscalant	Amber liquid	May cause slight irritation to the skin and moderate irrigation to the eyes	None	Nonflammable
Citric Acid	Colorless translucent crystals	Skin and mucous membrane irritant and severe eye irritant	Strong bases and oxidizing agents	Nonflammable
Cleaning Chemicals/Detergents	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Coagulant Aid Polymer (e.g. NALCO NALCOLYTE 8799)	Light yellow liquid	May cause irritation to skin and eyes with prolonged contact	Strong oxidizers	Nonflammable
Corrosion Inhibitor (NALCO 8305 Plus)	Light yellow liquid, sweet organic odor	Irritant to eyes, skin, and respiratory tract	Strong oxidizers, strong acids, and reactive metals	Nonflammable
Dispersant (NALCO TRASAR 23263)	Clear amber liquid	None	None	Nonflammable
Ferric Chloride	Clear, yellow-orange liquid	Corrosive: Causes burns to eyes and skin; ingestion may cause stomach pain, nausea, vomiting, shock, and diarrhea	Heat and evaporation	Nonflammable
Ferric Sulfate	Dark reddish-brown solution with mild odor	Corrosive: May cause irritation to mucous membranes, respiratory tract and lung tissue if inhaled or burns to skin and eyes; ingestion can cause stomach irritation, digestive tract burns, liver cirrhosis and fibrosis of pancreas	Cast iron/bronze, brass, 304ss, hastelloy B, copper and alloys, galvanized steel, aluminum, paints, enamels, and concrete	Nonflammable

TABLE 8.12-5
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Laboratory Reagents	Liquid and solid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lubrication Oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite	Flammable
Mineral Insulating Oil	Oily, clear liquid	Minor health hazard	Sodium hypochlorite	Can be combustible, depending on manufacturer
Scale Inhibitors (Polyacrylate)	Yellow green liquid	Corrosive and Toxic: Slight to moderate toxicity; irritation to skin and eyes	Strong acids	Nonflammable
Sodium Bisulfite	Yellow liquid	Corrosive: Irritation to eyes, skin, and lungs; may be harmful if digested	Strong acids and strong oxidizing agents	Nonflammable
Sodium Bromide	White crystals, granules, or powder; odorless	Causes irritation to skin, eyes, and respiratory tract; can cause damage to central nervous system if ingested	Acids, alkaloidal and heavy metal salts, oxidizers, and bromine trifluoride	Nonflammable
Sodium Hydroxide	Clear yellow liquid	Corrosive: Irritant to tissue in presence of moisture; strong irritant to tissue by ingestion	Water, acids, organic halogens, some metals	Nonflammable
Sodium Hypochlorite (Bleach)	Pale green; sweet, disagreeable odor. Usually in solution with H_2O or sodium hydroxide	Corrosive and Toxic: Toxic by ingestion; strong irritant to tissue	Ammonia and organic materials	Fire risk when in contact with organic materials
Sulfuric Acid	Colorless, dense, oily liquid	Strongly Corrosive: Strong irritant to all tissue; minor burns to permanent damage to tissue	Organic materials, chlorates, carbides, fulminates, metals in powdered form; reacts violently with water	Nonflammable

Data were obtained from Material Safety Data Sheets (MSDSs) and Lewis, 1991.

* Per Department of Transportation regulations, under 49 CFR 173: "Flammable" liquids have a flash point less than or equal to 141° F; "Combustible" liquids have a flash point greater than 141° F.

ammonia are included in Table 8.12-6. Alternatives to the use of the 29 percent solution of aqueous ammonia were considered, as discussed in Section 9 (Alternatives) and no feasible alternatives were identified. The use of ammonia generation technologies (urea to ammonia) are not feasible for this project as these processes require steam to be available on the project site and the SFERP project will not be generating steam. Furthermore, these technologies have not been installed on peaking units. The SFERP facility will store the 29-percent aqueous ammonia solution in a single stationary aboveground storage tank. The capacity of the tank will be approximately 12,000 gallons and the maximum quantity onsite will not exceed approximately 10,000 gallons. The tank will be surrounded by a secondary containment structure capable of holding the full contents of the tank, approximately 665 square feet (38 feet by 17.5 feet). The floor of the secondary containment structure will drain to a 24-inch-diameter drain that will lead to an underground spill containment vault (14 feet by 18 feet by 6 feet) via a 4-inch drain line.

TABLE 8.12-6
Toxic Effects and Exposure Levels of Regulated Substances

Name	Toxic Effects	Exposure Levels-Pure NH3
Aqueous Ammonia (29 percent solution)	Toxic effects for contact with pure liquid or vapor causes eye, nose, and throat irritation, skin burns, and vesiculation. Ingestion or inhalation causes burning pain in mouth, throat, stomach, and thorax, constriction of thorax, and coughing followed by vomiting blood, breathing difficulties, convulsions, and shock. Other symptoms include dyspnea, bronchospasms, pulmonary edema, and pink frothy sputum. Contact or inhalation overexposure can cause burns of the skin and mucous membranes, headache, salivation, nausea, and vomiting. Other symptoms include labored breathing, bloody mucous discharge, bronchitis, laryngitis, hemmoptysis, and pneumonitis. Damage to eyes may be permanent, including ulceration of conjunctiva and cornea and corneal and lenticular opacities.	Occupational Exposures: PEL = 35 mg/m^3 OSHA TLV = 18 mg/m^3 ACGIH TWA = 25 mg/m^3 NIOSH STEL = 35 mg/m^3 Hazardous Concentrations: IDLH = 500 ppm LD_{50} = 350 mg/kg – oral, rat ingestion of 3 to 4 ml may be fatal Sensitive Receptors: ERPG-1 = 25 ppm ERPG-2 = 200 ppm ERPG-3 = 1,000 ppm

ACGIH	American Conference of Government Industrial Hygienists
ERPG	Emergency Response Planning Guideline
ERPG-1	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects
ERPG-2	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without developing irreversible or serious health effects
ERPG-3	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing life-threatening health effects
IDLH	Immediately dangerous to life and health
LD_{50}	Dose lethal to 50 percent of those tested
LDLO	Lowest published lethal dose
mg/kg	Milligrams per kilogram
mg/m^3	Milligrams per cubic meter
NIOSH	National Institute of Occupational Safety and Health
PEL	Occupational Safety and Health Administration (OSHA) permissible exposure limit for 8-hr workday
ppm	parts per million
STEL	Short-term exposure limit, 15-min. exposure
TCLO	Lowest published toxic concentration
TLV	ACGIH threshold limit value for 8-hr workday
TWA	NIOSH time-weighted average for 8-hr workday

The aqueous ammonia supplier will be selected during the construction and commissioning phases of the project consistent with City procurement requirements. Aqueous ammonia suppliers in the area that may be considered are included in Table 8.12-7.

TABLE 8.12-7
Aqueous Ammonia Suppliers

Supplier	Shipping Location
Basic Chemical Solutions, LLC	Lathrop, CA
LA Chemical	San Jose, CA
Hill Brothers Chemicals Company	San Jose, CA

Aqueous ammonia will be delivered to the plant by truck transport. The truck loading area will be located within a bermed area adjacent to the storage tank. The floor of the loading area will be sloped to drain into the spill containment vault. The use of 29 percent aqueous ammonia will require approximately 14 deliveries of ammonia per year. The results of an Offsite Consequences Analysis presented in Subsection 8.12.5 show that release of a 29 percent solution of aqueous ammonia under a worst-case scenario will not cause significant offsite impacts to public health or safety.

In addition to the 29 percent solution of aqueous ammonia (10,000 gallons) that will be used onsite, other chemicals that will be stored at SFERP are sodium hypochlorite (400 gallons), sulfuric acid (400 gallons), and aluminum sulfate (800 gallons). These materials are additives used in the cooling tower or in the water treatment process. They are consumed in the process and produce no residual waste.

The sodium hypochlorite is a 10 to 12 percent solution, which is used in the process water treatment system and the cooling tower to control biological growth (algae). The sodium hypochlorite will be stored in a portable tote near the cooling tower and the water treatment building. It is expected that the bleach volume will provide 33 days of maximum continuous operation. Under a period of daily operation (rather than continuous), the preceding estimated days of chemical storage may double or be even longer. The sodium hypochlorite will be stored in a bermed area for secondary containment (an area capable of capturing any spills) that will be designed such that incompatible chemicals will be separated from each other to eliminate potential interactions/reactions in the event that the chemicals are accidentally released. It is estimated that the spill containment volume will be approximately 100 cubic feet.

The SFERP will use a 93 to 98 percent solution of sulfuric acid in the cooling tower to control water chemistry (i.e., pH). The SFERP facility will store sulfuric acid in a dedicated tote near the cooling tower and/or the water treatment building. It is expected that the sulfuric acid volume will provide 7 days of maximum continuous operation. Under a period of daily operation (rather than continuous), the preceding estimated days of chemical storage may double or be even longer. The sulfuric acid will be stored in a bermed area that will be designed such that incompatible chemicals will be stored separately to eliminate potential interactions/reactions in the event that the chemicals are accidentally released. It is estimated that the spill containment volume will be approximately 75 cubic feet.

The aluminum sulfate will be used by SFERP in the water treatment process to remove impurities from the process water and will be stored in two 400 gallon tanks. The tanks will be stored in a bermed area of the same design as described above.

If a chemical release were to occur without proper engineering controls in place, the public could be exposed to harmful vapors, and incompatible chemicals could mix, causing vapors that could also potentially have harmful effects. In addition, an uncontrolled release of liquid chemicals could run off and drain into the combined sewer system and potentially degrade water quality. However, the California Fire Code, Articles 79 and 80, includes specific requirements for the safe storage and handling of hazardous materials that would reduce the potential for a release of hazardous materials, and mixing of incompatible materials.

The design of the project will incorporate state-of-the-art chemical storage and handling facilities in compliance with the current California Fire Code and other applicable federal, state, and local regulations as discussed in Subsection 8.12.8.2.1. In addition, the chemicals will be stored outdoors in order to reduce exposure risks to workers. The facility may include some of the following onsite security measures to ensure that accidental releases will not occur: close circuit cameras; security personnel; and round the clock staffing.

As discussed in that section, the City will also be required to prepare an HMBP for the storage and handling of hazardous materials at the SFERP site. The plan will incorporate City emergency response procedures for hazardous materials incidents specified in the San Francisco Area Plan for Hazardous Materials Incidents. In accordance with the Aboveground Petroleum Storage Act, the aboveground petroleum storage will also be subject to the Act and an SPCC plan specifying methods to prevent and contain a spill will be prepared as discussed in Subsection 8.12.8.2.3.

During facility operations, potential hazards associated with contaminated soil and groundwater will be mitigated by compliance with the post-construction requirements of the RMP/SMP, including maintaining asphalt, concrete, or clean soil cover materials over site soil, establishing health and safety protocols to protect workers exposed to subsurface soil or groundwater, and preventing use of groundwater beneath the site. Additional information can be found in Subsection 8.13, Waste Management.

Because of its hazardous properties, aqueous ammonia is classified as a regulated substance, and an accidental release of the 29 percent aqueous ammonia could present the most likely potential for effects on the environment and/or human health of all the chemicals used at the site. Pure ammonia (NH_3) is a volatile, regulated substance that is very soluble in water. Aqueous ammonia consists of a solution of ammonia and water. If the aqueous ammonia solution were to leak or be released without proper controls, the ammonia in solution could escape or evaporate as a gas into the atmosphere.

Ammonia gas can be toxic to humans at sufficient concentrations. Potential toxic effects of ammonia and acceptable exposure levels are summarized in Table 8.12-6. The odor threshold of ammonia is about 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Ammonia concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 6,000 ppm (Smyth, 1956).

Storage and use of ammonia would be subject to the requirements of the California Fire Code, Article 80, described in Subsection 8.12.8.2.1, as well as the CalARP, described in Subsection 8.12.8.2.2. Article 80 of the California Fire Code contains specific requirements for control of liquid and gaseous releases of hazardous materials. Secondary containment in the form of an underground spill containment vault, as described earlier in Subsection 8.12.4.2, will be provided for the ammonia storage tank and loading area. In addition, the facility will be required to prepare an RMP in accordance with the CalARP, further specifying safe handling procedures for the ammonia as well as emergency response procedures in the event of an accidental release.

Sulfuric acid is also identified as a regulated substance under the CalARP program, but only if it is concentrated with greater than 100 pounds of sulfur trioxide, if it meets the definition of oleum, or if it is stored in a container with flammable hydrocarbons. The sulfuric acid that will be used at the facility meets none of these criteria. Therefore, sulfuric acid is not subject to CalARP requirements.

With construction in accordance with applicable laws and regulations, provision of secondary containment for storage and loading facilities, preparation of a HMBP, preparation of a SPCC plan, and preparation of an RMP, discussed in Subsections 8.12.8.2.1 through 8.12.8.2.3, potential public health and environmental impacts related to the use of hazardous materials and regulated substances are mitigated to a less than significant level.

8.12.5 Offsite Migration Modeling

Because there is human activity in the vicinity of the proposed site, a vulnerability analysis was performed to assess the risk to humans from the site if a spill or rupture of the aqueous ammonia storage tank were to occur. Dispersion modeling was conducted using the SLAB numerical dispersion model (LLNL, 1990).

The worst-case accidental release scenario assumed the aqueous ammonia storage tank was punctured and the entire contents was spilled into a catch basin or bermed area located beneath the tank. An initial ammonia emission rate for an evaporating pool of 29 percent aqueous ammonia solution was calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999* and using the "evaporation calculator" provided by the National Oceanic and Atmospheric Administration (NOAA, 2002). Release rates for ammonia vapor from an evaporating 29-percent solution of aqueous ammonia were calculated assuming mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The ammonia release rate was calculated using the evaporation calculator, meteorological data listed below and the dimensions of the secondary containment area. The offsite consequence analysis is provided as Appendix 8.12A.

An initial ammonia evaporation rate was calculated and assumed to occur for at least one hour. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins. Parameters used to calculate the initial ammonia emission rate include an atmospheric stability classification of "F," a wind speed of 1.5 meters/second and a temperature of 97 degrees Fahrenheit (°F). Using these parameters, the ammonia plume was predicted to extend approximately 30.13 meters

(99 feet) at the height of 1.6 m from the ammonia storage tank at a concentration of 200 ppm. At a concentration of 75 ppm, the distance was 31.1 meters (102 feet) from the tank at the height of 1.6 m. The assumptions used in this analysis include the following:

- A total mass release of 3,413 pounds of ammonia is assumed to occur over 1 hour, representing an evaporating pool of 10,000 gallons of a 29 percent ammonia solution
- An ammonia storage temperature of 97 °F (highest temperature recorded at San Francisco International Airport [SFO] over the past 3 years)
- A diked area of 665 square feet (17.5 feet wide by 38 feet long)
- A roughness length of 0.4 meters, representing an urban, industrial area

Based on this conservative modeling analysis, the worst case accident is not expected to result in an offsite release greater than 5 ppm to the north, south, or east of the site. Thus, offsite concentrations in publicly accessible areas will be below 5 ppm. Offsite concentrations of greater than 2,000 ppm could occur to the west of the site approximately 35 feet onto the proposed MUNI Maintenance and Operations Center, which will not be accessible by the public. Since the general public will not be exposed to ammonia concentrations above 5 ppm during a worst-case release scenario, the storage of aqueous ammonia onsite will not pose a significant risk to the public. The Applicant will install ammonia sensors to activate audible alarms and flashing lights to alert MUNI and SFERP personnel should a spill occur. The applicant will also work with the MUNI Maintenance and Operations Center to determine other appropriate means of notifying MUNI staff should there be a release, and provide training on the proper response in the event of a spill including notification of hazardous response teams.

Table 8-12.8 identifies the extent of the gaseous ammonia concentrations to the west in the unlikely event of a catastrophic release.

TABLE 8.12-8
Gaseous Ammonia Concentrations to the West in the Event of a Release

Concentration (ppm)	Distance from Ammonia Tank to Plume Edge (feet)	Distance from SFERP Fenceline to Plume Edge (on proposed MUNI Maintenance and Operations Center) (feet)
2000 ppm (risk of lethality)	84.6	35.4
300 ppm (OSHA's IDLH)	97.5	48.0
200 ppm (EPA/CalARP toxic endpoint)	98.9	49.4
75 ppm (CEC Significance Value)	102.1	52.9
25 ppm (San Francisco Public Health Department)	111.2	61.6
5 ppm (Odor Threshold)	114.8	66.5

Notes:

The complete Offsite Consequence Analysis may be found in Appendix 8.12A.
Distances calculated based off the height of the average human (1.6 m).

8.12.6 Fire and Explosion Risk

Table 8.12-5 describes the flammability for the hazardous materials that will be onsite. With the exception of ammonia and lubricating oils, all hazardous materials are nonflammable. Article 80 of the California Fire Code requires all hazardous materials storage areas to be equipped with a fire extinguishing system and also requires ventilation for all enclosed hazardous material storage areas.

Aqueous ammonia, which constitutes the largest quantity of hazardous materials onsite (except for the oil contained in the equipment) and is the only chemical classified as a regulated substance, is incombustible in its liquid state. Under normal storage conditions, ammonia would not evaporate to the atmosphere because it would be contained within a totally enclosed system equipped with ventilation as required by Article 80 of the California Fire Code and described in Subsection 8.12.8.2.2. In the unlikely event that a release were to occur, ammonia could evaporate as a vapor. Ammonia vapor is combustible only within a narrow range of concentrations in air. The evaporation rate of aqueous ammonia is similar to water, which is sufficiently low that the lower explosion limit (LEL) of 15 percent (or 15,000 parts per million) will not be reached.

The lubrication oil is flammable. In accordance with Article 80 of the California Fire Code, the storage area for the lubrication oil would be equipped with a fire extinguishing system and the lubrication oil would be handled in accordance with an HMBP approved by the SFDPH and the CEC. With proper storage and handling of flammable materials in accordance with the California Fire Code and the site-specific HMBP, the risk of fire and explosion at the generating facility would be minimal.

The natural gas fuel the facility will use is flammable and could leak from the pipeline that brings the gas from the main PG&E distribution pipeline. Natural gas is composed mostly of methane, but also may contain ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and is lighter than air. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and explosion if an accidental release were to occur. However, the risk of a fire and/or explosion would be reduced through compliance with applicable codes, regulations, and industry design/construction standards.

The federal safety and operating requirements for natural gas pipelines are contained in Title 49 of the Code of Federal Regulations, Parts 190 through 192. These requirements vary according to population density and land use; the pipeline classes are defined as follows:

- Class 1 includes pipelines in locations with 10 or fewer buildings intended for human occupancy.
- Class 2 includes pipelines in locations with more than 10, but fewer than 46 buildings intended for human occupancy.
- Class 3 includes pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days per week for 10 weeks in any 12-month period.

- Class 4 includes pipelines in locations where buildings with 4 or more stories aboveground are prevalent.

The project's pipeline will be designed to meet Class 3 service and will meet California Public Utilities Commission General Order 112-D and 58-A standards, in addition to the federal requirements for gas pipeline construction and safety.

The closest San Francisco fire station is Station No. 25 at 3305 3rd Street. The station is approximately 0.5 mile away and would provide the first response to a fire at the project site. If hazardous materials were involved in the incident, the San Francisco Fire Department Hazardous Materials Team located in Station No. 36 at 109 Oak Street would also be called to respond. This station is located approximately 4 miles from the project site. In addition, the San Francisco Environmental Health Section of the Department of Public Health provides emergency responders that serve as technical consultants for the Fire Department's Hazardous Materials Team.

8.12.7 Cumulative Impacts

A cumulative impact of the use and storage of hazardous materials could occur if there were a simultaneous release of a chemical that could migrate offsite from two or more sites. Potentially, the two or more migrating releases could combine, thereby posing a greater threat to the offsite population than a single release from any single site. Ammonia is the only hazardous material that will be used during project operation that would be stored in sufficient quantity onsite to have the potential to cause such a cumulative impact.

As discussed in Subsection 8.12.5, an ammonia plume that could occur as a result of a catastrophic release from the ammonia tank would be expected to extend westward from the ammonia tank, just over the project fence onto the proposed MUNI Operations and Maintenance Center. A predicted plume concentration of 2,000 parts per million would extend approximately 35 feet onto the MUNI site from the SFERP's western fence line. The predicted plume concentration rapidly drops to 25 parts per million on the MUNI site at a distance of 62 feet from the SFERP western fence line.

To determine if other facilities have the potential to result in cumulative release of chemicals, the facilities that have filed an RMP with the SFDPH were identified and are summarized in Table 8.12-9. These facilities with completed RMPs would be considered to have the greatest potential to cause a cumulative impact in the event of a simultaneous release. As shown in Table 8.12-9, the identified facilities all handle ammonia and are located over 0.5 mile from the project site. Since most of these facilities are located more than 0.5 mile from the project site, in the event of a simultaneous release of ammonia from one of these facilities and from the SFERP project, the cumulative impacts are negligible. There is however one facility, the Potrero Power Plant (Potrero PP) which is located approximately 0.5 mile north of the project. The Potrero PP has completed a RMP, and the San Francisco Department of Public Health has deemed it complete, pending a public comment period. The Potrero PP RMP offsite consequence analysis was performed using the SFDPH guidance, which strongly encourages the use of EPA's RMP*Comp program. This program provides an conservative estimate of the offsite impacts to be used for planning purposes. The distance to the 200 ppm ammonia toxic endpoint modeled in the Potrero PP RMP is 0.9 miles, which would intersect the SFERP plume, if the three ammonia

storage tanks (two Potrero PP tanks and the SFERP ammonia tank) were to experience a catastrophic failure at the same time. The probability of this occurring is remote. Regardless, the combination of the Potrero PP ammonia plume with the SFERP plume would not impact residential receptors (the SFERP ammonia plume is confined to the project site and the adjacent MUNI site). Therefore, the cumulative impacts associated with a release of ammonia from the SFERP and Potrero PP are insignificant.

TABLE 8.12-9
Facilities in San Francisco That Have Filed a Risk Management Plan for Ammonia Use/Storage

Site Name	Address	Regulated Substance	Approximate Distance from Project Site, Miles
UCSF/CUP Containment Structure	2 Medical Center Way	Ammonia	6
C.J. Figone Cold Storage	420 17th Street	Ammonia	1.2
Dean's Services	1600 Donner Avenue	Ammonia	2.2
Growers Refrigeration, Inc.	2050 Galvez Avenue	Ammonia	1.3
Potrero PP (in progress)	1201 Illinois Street	Ammonia	0.5*

Sources: SFDPH, 2005
* The Potrero PP has filed an RMP with the San Francisco Department of Public Health and was deemed complete, pending public comment.

8.12.8 Proposed Mitigation Measures

The following subsections present measures included in the project to mitigate potential public health and environmental impacts of handling hazardous materials and regulated substances during construction and operation.

8.12.8.1 Construction Phase

As discussed in Subsection 8.12.4, the hazardous materials that would be used during construction present a relatively low public health risk, but could contaminate surface water or groundwater if a release occurred. Registering these hazardous materials in accordance with Article 21 of the San Francisco Health Code and use of best management practices would reduce the potential for the release of construction-related fuels and other hazardous materials to stormwater and receiving waters as discussed in Subsection 8.14, Water Resources. Best management practices prevent sediment and stormwater contamination from spills or leaks, control the amount of runoff from the site, and require proper disposal or recycling of hazardous materials.

Service personnel will follow general industry health, safety, and environmental standards for filling and servicing construction equipment and vehicles. The standards are designed to reduce the potential for incidents involving the hazardous materials. They include the following:

- Refueling and maintenance of vehicles and equipment will occur only in designated areas that are either bermed or covered with concrete or asphalt to control potential spills. Employees will be present during refueling activities.
- Vehicle and equipment service and maintenance will be conducted only by authorized personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.

- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual fuel from the hose.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil will be put in containers and disposed of as appropriate. All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure. All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook that will be maintained onsite.

In the unlikely event of a spill, the spill may need to be reported to the appropriate regulatory agencies and cleanup of contaminated soil could be required. Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. All personnel working on the project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. An onsite health and safety person will be designated to implement health and safety guidelines and to contact emergency response personnel and the local hospital, if necessary.

If there is a large spill from a service or refueling truck, contaminated soil will be placed into barrels or trucks by service personnel for offsite disposal at an appropriate facility in accordance with law. If a spill involves hazardous materials equal to or greater than the specific reportable quantity (25 gallons for petroleum products), all federal, state, and local reporting requirements will be followed. In the event of a fire or injury, the local fire department will be called (City of San Francisco Station No. 25).

8.12.8.2 Operation Phase

During facility operation, various hazardous materials and one regulated substance will be stored onsite as shown in Table 8.12-3 as shown in Table 8.12-3. Table 8.12-4 presents information about these materials, including trade names, chemical names, Chemical Abstract Service (CAS) numbers, maximum quantities onsite, RQs, CalARP TPQs, and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 8.12-5, which also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia). Table 8.12-6 describes the toxicity of the regulated substance and hazardous materials. Listed below are mitigation measures for minimizing the public health risks associated with hazardous material and regulated substance handling during facility operation.

8.12.8.2.1 Hazardous Materials. All hazardous materials will be handled and stored in accordance with applicable codes and regulations specified in Subsection 8.12.2. Specific requirements of the California Fire Code that reduce the risk of fire or the potential for a release of hazardous materials that could affect public health or the environment include:

- Provision of an automatic sprinkler system for indoor hazardous material storage areas.
- Provision of an exhaust system for indoor hazardous material storage areas.
- Separation of incompatible materials by isolating them from each other with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas.
- Separate secondary containment for each chemical storage system. The secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill.

In addition, an HMBP is required by CCR Title 19 and the Health and Safety Code (Section 25504) as well as Article 21 of the San Francisco Health Code, which incorporates state requirements for hazardous materials handling and specifies some more stringent requirements. In accordance with these regulations, the HMBP will include an inventory and location map of hazardous materials onsite and an emergency response plan for hazardous materials incidents. Specific topics to be covered in the plan include:

- Facility identification
- Emergency contacts
- Chemical inventory information (for every hazardous material)
- Site map
- Emergency notification data
- Procedures to control actual or threatened releases
- Emergency response procedures
- Training procedures
- Certification

The HMBP will be filed with the SFDPH and updated annually in accordance with applicable regulations. The SFDPH will ensure review by and distribution to other potentially affected agencies including the San Francisco Fire Department.

In accordance with emergency response procedures specified in the HMBP, designated personnel will be trained as members of a plant hazardous material response team, and team members will receive the first responder and hazardous material technical training to be developed in the HMBP, including training in appropriate methods to mitigate and control accidental spills. However, in the event of a chemical emergency, plant personnel will defer to the San Francisco Hazardous Materials Team at San Francisco Fire Station No. 36 (109 Oak Street), approximately 4 miles away.

8.12.8.2.2 Aqueous Ammonia. Aqueous ammonia will be used in a selective catalytic reduction (SCR) process to control NO_x emissions created in the combustion chambers of the

combustion turbines. The SCR system will include a reactor chamber, catalyst modules, an ammonia storage system, and an ammonia injection system. The aqueous ammonia, stored as a liquid solution of 29 percent ammonia and 71 percent water, will be injected into the reactor chamber. The rate of injection will be controlled by a monitoring system that uses sensors to determine the correct quantity of ammonia to feed to the reactor chamber. The reactor chamber will contain the catalyst modules and be located where the catalyst will be most effective at the desired levels of plant operation.

Approximately once every 9 days during full operation (or a maximum of 14 deliveries per year), one 6,500-gallon tanker truck will deliver aqueous ammonia to the site. The ammonia will be stored in an aboveground stationary tank with a 12,000-gallon capacity with the maximum quantity onsite will not exceed approximately 10,000 gallons, contained within a secondary containment system, as required by the Uniform Fire Code. This containment system includes a concrete containment area surrounding the tank. The containment area will have a sloped floor, which will direct any liquid to a 24-inch drain centered below the tank. This drain will lead to a covered sump. The aqueous ammonia storage tank will be equipped with continuous tank level monitors, automated leak detection system, temperature and pressure monitors and alarms, and excess flow and emergency block valves.

Ammonia is a regulated substance under the federal Clean Air Act pursuant to 40 CFR 68 (Subpart G) and the CalARP pursuant to Health and Safety Code Sections 25331 through 25543.3. The California program is similar to the federal program but is more stringent in some areas.

In accordance with CalARP regulations, a RMP will be required in addition to the HMBP described above. The document, " Local Guidance Document for Preparation of a Risk Management Plan (RMP)" will be obtained from the San Francisco Department of Public Health will be used to prepare the RMP. The RMP includes a hazard assessment to evaluate the potential effects of an accidental release, a program for preventing an accidental release, and a program for responding to an accidental release. The specific components of an RMP include:

- Description of the facility
- Accident history of the facility
- History of equipment used at the facility
- Design and operation of the facility
- Site map(s) of the facility
- Piping and instrument diagrams of the facility
- Seismic analysis
- Hazard and operability study
- Prevention program
- Consequence analysis
- Offsite consequence analysis
- Emergency response
- Auditing and inspection
- Record keeping
- Training
- Certification

The RMP is prepared interactively with the SFDPH and the public is provided with an opportunity for review and input to the plan as part of the public hearing/notification requirements of Article 21A of the San Francisco Health Code. The RMP will be filed with and administered by the SFDPH. This department will ensure review by and distribution to other potentially affected agencies including the San Francisco Fire Department and Bay Area Air Quality Management District.

A Process Safety Management Plan (PSM) will not be required under OSHA, because the OSHA regulations apply only to aqueous ammonia solutions above 44 percent (29 CFR Part 199). The requirements for a PSM are very similar to those for an RMP although an offsite consequences analysis is not required for the PSM. The RMP may be sufficient to also meet the requirements of a PSM plan, if required.

8.12.8.2.3 Petroleum Products. Federal and California regulations require a SPCC plan if petroleum products above certain quantities are stored. Both federal and state laws apply only to petroleum products that might be discharged to navigable waters. If stored quantities are equal to or greater than 660 gallons for a single container, or equal to or greater than 1,320 gallons total (including ASTs, oil-filled equipment, and drums), an SPCC must be prepared. Since the facility will store more than 1,320 gallons of petroleum products, an SPCC plan will be prepared.

8.12.8.2.4 Transportation/Delivery of Hazardous Materials and Regulated Substances. Hazardous materials and one regulated substance will be delivered periodically to the facility. As discussed in Subsection 8.10, Traffic and Transportation, transportation of hazardous materials will comply with all Department of Transportation (Caltrans), USEPA, California Department of Toxic Substances Control (DTSC), CHP, and California State Fire Marshal regulations. Under the California Vehicle Code, the CHP has the authority to adopt regulations for transporting hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery. Aqueous ammonia, the only regulated substance that will be delivered to the facility, will be transported in accordance with Vehicle Code Section 32100.5, which regulates the transportation of hazardous materials that pose an inhalation hazard. In addition, ammonia will only be transported along approved transportation routes. The approved route would be from Interstate 280 to Cesar Chavez Street, to Illinois Street, to 25th Street, to the project site.

8.12.8.2.5 Security Plan. In addition to standard industrial business security measures, the City will be preparing a security plan that will include the following elements:

- Descriptions of the site fencing and security gate
- Evacuation procedures
- A protocol for contacting law enforcement in the event of conduct endangering the facility, its employees, its contractors, or public
- A fire alarm monitoring system
- Measures to conduct site personnel background checks, including employee and routine on-site contractors consistent with state and federal law regarding security and privacy
- A site access protocol for vendors

- A protocol for Hazardous Materials vendors to prepare and implement security plans as per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks as per 49 CFR Part 172, Subpart I

The plan will also include a demonstration that the perimeter security measures will be adequate. The demonstration may include one or more of the following:

- security guards
- security alarm for critical structures
- perimeter breach detectors and on-site motion detectors
- video or still camera monitoring system

8.12.8.3 Monitoring

In accordance with applicable federal, state, and local regulations, site personnel would regularly inspect all hazardous materials handling facilities for compliance with applicable regulations and would ensure that any deficiencies were promptly repaired. In addition, the facility would be subject to regular inspections by the SFDPH and San Francisco Fire Department, which would ensure compliance with appropriate regulatory requirements for hazardous materials and regulated substances handling.

8.12.9 Involved Agencies and Agency Contacts

Several agencies regulate hazardous materials and they will be involved in regulating the hazardous materials stored and used at the facility. At the federal level, the USEPA will be involved; at the state level, the California Environmental Protection Agency (CalEPA) will be involved. However, local agencies are primarily responsible for enforcing hazardous materials laws. For the project, the local agencies involved will be the SFDPH and San Francisco Fire Department, Fire Prevention Bureau. The persons to contact are shown in Table 8.12-10.

TABLE 8.12-10
Agency Contacts

Type Material	Agency	Contact	Title	Telephone
Storage of Hazardous Materials and Regulated Substances	San Francisco Department of Public Health	Sue Cone	Program Manager	(415) 252-3991
Storage of Hazardous Materials and Regulated Substances	San Francisco Fire Department	Mary Boucher	Fire Inspector	(415) 558-3306
Hazardous Materials Response	San Francisco Fire Department, Station 36	Battalion Chief Burke	Acting Battalion Chief	(415) 558-3236

8.12.10 Permits Required and Permit Schedule

The SFDPH will require an HMBP for the storage of hazardous materials during construction and operation as well as an RMP for the storage of regulated substances. In addition, the San Francisco Fire Department could require the following permits related to construction of the chemical handling facilities and hazardous materials use during operation:

- **Building Permit.** This permit is required for construction of the aboveground storage tanks.
- **Fire Permit.** This permit is required for installation of the aboveground storage tanks.
- **Hazardous Materials Use and Storage Permit.** This permit is required for the use of hazardous materials during operation.

8.12.11 References

AGS, Inc. 2000. Final Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility. Prepared for San Francisco Municipal Railway. February

Dames and Moore. 2000. Application for Certification. Potrero Power Plant Unit 7 Project. Section 8.15 Geologic Hazards and Resources. Prepared for Southern Company.

Lewis, Richard J. Sr. 1991. *Hazardous Chemical Desk Reference,* 2nd Edition.

LLNL. 1990. User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-Than-Air Releases. D.E. Ermak. Lawrence Livermore National Laboratory. June.

National Oceanic and Atmospheric Administration (NOAA). 2002. Evaporation Calculator, CAMEO Toolkit. http://response.restoration.noaa.gov/cameo/evapcalc/evap.html#.

San Francisco Department of Public Health (SFDPH). 2005. List of Regulated Substances Facilities. Emailed to Sarah Madams/CH2M HILL on February 7, 2005.

Smyth H.F., Jr. 1956. Improved Communication: Hygienic Standards for Daily Inhalation. *Am. Ind. Hyg. Assoc.* Q *17*(2):129-185.

U. S. Environmental Protection Agency (USEPA). 1999. RMP Offsite Consequence Analysis Guidance. April.

SUBSECTION 8.13

Waste Management

8.13 Waste Management

8.13.1 Introduction

This subsection evaluates the potential effects on human health and the environment from nonhazardous and hazardous waste generated at the San Francisco Electric Reliability Project (SFERP) and from potential hazardous and nonhazardous wastes in the soil and groundwater as a result of historic site activities. Subsection 8.13.2 presents laws, ordinances, regulations, and standards (LORS) that apply to wastes that will be generated during construction and operation of the project as well as to remediation and disposal of contaminated soil and groundwater. Subsection 8.13.3 describes the current condition of the proposed site and plans for management of existing soil and groundwater contamination within the project area. Subsection 8.13.4 describes the wastes that are expected to be generated by the project. Subsection 8.13.5 describes recycling goals and waste disposal sites for nonhazardous and hazardous waste.

Subsection 8.13.6 describes methods that will be employed to manage the waste generated during construction and operation of the SFERP, as well as potential contaminants in the soil and groundwater. Section 8.13.6 also discusses how the potential impacts of such wastes on the environment will be mitigated. Subsection 8.13.7 discusses cumulative impacts. Subsection 8.13.8 describes monitoring that would be conducted to ensure that recycling goals are met, wastes are handled and disposed of in a legally appropriate manner, and no unacceptable exposure to hazardous wastes occurs in the soil and groundwater during operation. Subsection 8.13.9 describes agencies that have jurisdiction over the generated waste and specifies the contact person in those agencies. Subsection 8.13.10 describes permits required for generated waste and a schedule for obtaining those permits, and Subsection 8.13.11 provides the references used to prepare this subsection.

8.13.2 Laws, Ordinances, Regulations, and Standards

At SFERP, nonhazardous and hazardous waste handling will be governed by federal, state, and local laws, ordinances, regulations, and standards. Applicable laws and regulations address proper waste handling, storage, and disposal practices to protect the environment from contamination and to protect facility workers and the surrounding community from exposure to nonhazardous and hazardous waste. Table 8.13-1 presents a summary of the LORS applicable to waste handling at the SFERP facility. In addition, there is potential for soil and groundwater contamination within the project site that may require mitigation prior to (or during) construction of the project. The local ordinance applicable to this mitigation is also summarized in Table 8.13-1.

8.13.2.1 Federal

The federal statute that regulates both nonhazardous and hazardous waste is the Resource Conservation and Recovery Act (RCRA) contained in Title 42 of the United States Code (USC) Section 6901, et seq. RCRA's implementing regulations are contained in Title 40 of the Code of Federal Regulations, Section 260, et seq. Subtitle D assigns responsibility for the regulation of nonhazardous waste to the states; federal involvement is limited to establishing minimum criteria that prescribe the best practicable controls and monitoring

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Federal		
Resource Conservation and Recovery Act (RCRA) Subtitle D (Pub. L. 94-580, 42 U.S.C. 6901 et seq.) Solid Waste (40 CFR 239-259)	Regulates design and operation of solid waste landfills where nonhazardous wastes from construction and operation of the SFERP that are not recycled will be disposed.	Solid waste will be collected and disposed of by a collection company at a solid waste landfill that is permitted in conformance with Subtitle D (Subsections 8.13.6.1.2, 8.13.6.2.1, and 8.13.7).
RCRA Subtitle C (Pub. L. 94-580, 42 U.S.C. 6921 et seq.) Hazardous Waste (40 CFR 260-299)	Controls storage, transportation, treatment, and disposal of hazardous waste.	Contractors will handle hazardous waste in conformance with Subtitle C (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
Clean Water Act (CWA) (33 U.S.C. 1251 et seq.) Water Programs (40 CFR 100-149)	Controls discharge of wastewater to the surface waters of the U.S.	Industrial and sanitary wastewater will be discharged to the San Francisco combined sewer system (Subsections 8.13.6.1.3 and 8.13.6.2.1).
State		
California Integrated Waste Management Act (CIWMA) (California Public Resources Code, Section 40000 et seq.) California Integrated Waste Management Board (14 CCR 17000 et seq.)	Controls solid waste collectors, recyclers, and depositors. Mandates local jurisdictions to meet diversion, or recycling, goals of 25 percent by 1995 and 50 percent by the year 2000.	Solid waste will be collected and recycled or disposed of by a collection company in conformance with the CIWMA (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.7).
Hazardous Waste Control Law (HWCL) (California Health and Safety Code, Chapter 6.5)	Controls storage, transportation, treatment, and disposal of hazardous waste.	Hazardous waste will be handled in conformance with the HWCL (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
Environmental Health Standards for the Management of hazardous Waste (22 CCR 66001 et seq.)	Controls storage transportation treatment, and disposal of hazardous waste.	Hazardous waste will be handled in conformance with the Title 22 regulations. (Subsections 8.13.6.14, 8.13.6.2.2, and 8.13.7).
Porter-Cologne Water Quality Control Act (California Water Code, Section 13000 et seq.)	Controls discharge of wastewater to surface waters and ground waters of California.	Industrial and sanitary wastewater will be discharged to the San Francisco combined sewer system (Subsections 8.13.6.1.3 and 8.13.6.2.1).
Asbestos Airborne Toxic Control Measure (California Air Resources Board Regulation) (17 CCR 93106)	Requires implementation of standard dust control measures for projects that disturb less than one acre of soil or rock containing asbestos and preparation of an asbestos dust mitigation plan for projects disturbing an area greater than one-acre.	If applicable, standard dust control measures will be implemented or an asbestos dust mitigation plan will be prepared in accordance with the measure (Subsection 8.13.6.1.2).

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Hazardous Waste Source Reduction and Management Review Act of 1989 22CCR §67100.1 et seq.	Requires generators of hazardous waste above threshold quantities to prepare a source reduction plan and submit a performance report documenting waste recycling and minimization efforts.	If the SFERP generates hazardous wastes in excess of threshold quantities, the City will file the required documentation (Subsections 8.13.2.2, 8.13.6.2, and 8.13.8).
California Fire Code	Controls storage of hazardous materials and wastes and the use and storage of flammable/combustible liquids.	Wastes will be accumulated and stored in accordance with Fire Code requirements. Permits for storage of hazardous waste will be obtained, as needed, from the San Francisco Fire Department (Subsection 8.13.10).
Local		
San Francisco General Plan, Environmental Protection Element, Objective 19	Promotes source reduction through reduced use of hazardous materials and generation of hazardous wastes.	The SFERP will minimize the use of hazardous materials and recycle as much waste as possible (Subsections 8.13.6 and 8.13.7).
San Francisco General Plan, Environmental Protection Element, Objective 21	Controls illegal disposal and eliminates land disposal of untreated waste by requiring legal disposal of waste and encouraging enforcement actions against generators who dispose of hazardous wastes illegally.	The SFERP will legally dispose of all hazardous waste and will recycle as much of this waste as possible (Subsections 8.13.6.1.2, 8.13.6.1.4, and 8.13.6.2.2).
San Francisco Source Reduction and Recycling Element of the County Integrated Waste Management Plan	Specifies how the City and County would achieve waste diversion goals of 25 percent by 1995 and 50 percent by 2000, including requirements for source reduction and recycling.	The SFERP will comply with the goals of the Source Reduction and Recycling Element (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.7).
City and County of San Francisco Resolution 679-02	Establishes a citywide goal of 75 percent recycling by 2010 and a long-term goal of zero waste.	The SFERP will comply with the City and County of San Francisco recycling goal (Subsections 8.13.6.1.3, 8.13.6.2.1, 8.13.7, and 8.13.8).
City and County of San Francisco Resolution 002-03-COE	Establishes a citywide goal of zero waste production by 2020.	The SFERP will comply with the City and County of San Francisco recycling goal (Subsections 8.13.6.1.3, 8.13.6.2.1, 8.13.7, and 8.13.8).
City and County of San Francisco Hazardous Waste Management Plan	Provides guidance for local management of hazardous waste.	The SFERP will comply with the City and County Hazardous Waste Management Plan (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.7).
San Francisco Health Code, Article 6	Provides regulatory requirements for garbage and refuse collection and transfer stations in the City and County of San Francisco.	Refuse collection will comply with the requirements of Article 6 (8.13.6.1.3 and 8.13.6.2.1).

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
San Francisco Public Health Code, Article 21	Requires preparation of a Hazardous Materials Business Plan (HMBP) for storage of hazardous materials, including hazardous wastes. Also requires owner to close the facility in accordance with an approved closure plan.	An HMBP will be prepared for submittal to the San Francisco Department of Public Health and a closure plan will be prepared and implemented upon closure of the facility (Sections 8.13.6.1.4, 8.13.6.2.2, and 8.13.6.3.2).
San Francisco Public Health Code, Article 22	Specifies requirements for hazardous waste management in San Francisco.	Hazardous wastes produced during construction and operation will be managed in accordance with Article 22 (Subsections 8.13.6.1.4, 8.13.6.2.2, and 8.13.8).
San Francisco Public Health Code, Article 22A	Previously referred to as the "Maher Ordinance," requires a site history, soil investigation, and mitigation plan for site contamination for sites bayward of the historic high tide line that require disturbance of 50 cubic yards or more of soil.	A site history will be prepared as required by the San Francisco Public Health Department. Based on the site history and the potential for contamination at the site, the SFERP will comply with the Risk Management Plan/Site Management Plan (RMP/SMP) approved by the San Francisco Bay RWQCB for the adjacent MUNI property (Subsections 8.13.6.1.2, 8.13.6.2.3, and 8.13.8).
San Francisco Public Works Code, Article 4.1	Establishes discharge limitations for industrial wastewater discharges to the combined sewer system and requires a permit for discharge.	Groundwater produced during dewatering and nonhazardous wastewater produced during construction and operation of the SFERP will be discharged to the combined sewer system in accordance with the requirements of this article (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.8).
City and County of San Francisco Department of Public Works Order No. 158170	Specifies discharge limitations for discharge to the combined sewer system in addition to those specified in Article 4.1.	Groundwater produced during dewatering and nonhazardous wastewater produced during construction and operation of the SFERP will be discharged to the combined sewer system in accordance with the requirements of this order (Subsections 8.13.6.1.3, 8.13.6.2.1, and 8.13.8).
Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility (Prepared for the San Francisco MUNI, administered by the San Francisco Bay Regional Water Quality Control Board)	Provides specific protocols for managing soil and groundwater before, during and after construction and development to mitigate risks to human health, including site workers, and the environment.	Water generated during dewatering and other construction wastewater will be contained for subsequent off-site disposal. Excavated soil can be reused and removed from the site in accordance with the RMP/SMP for the MUNI site.

requirements for solid waste disposal facilities where nonhazardous waste from the SFERP that is not recycled will be disposed. Subtitle C controls the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle-to-grave" system of hazardous waste management techniques and requirements. It applies to all states and to all hazardous waste generators (above certain levels of waste produced). The SFERP will conform to this law in its generation, storage, transportation, and disposal of any hazardous waste generated at the facility. The United States Environmental Protection Agency (USEPA) has delegated its authority for implementing the law to the State of California.

The USEPA regulates wastewater under the Clean Water Act (CWA). The discharge of cooling tower blowdown, industrial wastewater, and sanitary wastewater to the San Francisco combined sewer system would be regulated by this act, which is described in more detail in Subsection 8.14, Water Resources.

8.13.2.2 State

In California, nonhazardous solid waste is regulated by the California Integrated Waste Management Act (CIWMA) of 1989, found in Public Resources Code (PRC) Section 40000, et seq. This law provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. It mandates local jurisdictions to meet diversion, or recycling, goals of 25 percent by 1995 and 50 percent by the year 2000. In accordance with this law, counties are required to submit Integrated Waste Management Plans to the state. This law directly affects the City and County of San Francisco and the solid waste hauler and disposer that will collect SFERP solid waste.

RCRA allows states to develop their own programs to regulate hazardous waste, provided that they are at least as stringent as the Federal standards. California's hazardous waste program is contained in the California Hazardous Waste Control Law (HWCL) specified in Health and Safety Code Section 25100, et seq. The HWCL is more stringent than RCRA and regulates additional hazardous wastes that are not classified as hazardous under RCRA. Because California has its own hazardous waste control law, hazardous waste management during construction and operation of the SFERP facility will be subject to, and comply with, the HWCL.

The Hazardous Waste Source Reduction and Management Review Act of 1989, codified in Title 22 of the California Code of Regulations, section 67100.1, et seq., requires facilities generating hazardous wastes in excess of 5,000 kilograms or 5 kilograms of extremely hazardous waste to examine their waste generating processes to determine the amounts and types of wastes generated; determine waste minimization procedures to reduce waste generation at the source; develop a Hazardous Waste Source Reduction and Evaluation Plan; and prepare a hazardous waste performance report. The SFERP will prepare the required planning and documentation.

Wastewater is regulated under the Porter-Cologne Water Quality Control Act by the State Water Resources Control Board and San Francisco Bay Regional Water Quality Control Board. Cooling tower blowdown, industrial wastewater, and sanitary wastewater

discharged to the San Francisco combined sewer system would be subject to this act, which is described in more detail in Subsection 8.14, Water Resources.

The California Air Resources Board (CARB) adopted the Asbestos Airborne Toxic Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations (CARB, 2002) which became effective in the Bay Area Air Quality Management District (BAAQMD) on November 19, 2002. The ATCM requires use of best available dust mitigation measures to prevent offsite migration of asbestos-containing dust from road construction and maintenance activities, construction and grading operations, and quarrying and surface mining operations in areas of ultramafic rock (ultramafic rocks are formed in high temperature environments well below the surface of the earth), serpentine rock (serpentine is a naturally occurring group of minerals that can be formed when ultramafic rocks are metamorphosed during uplift to the earth's surface. Serpentinite is a rock consisting of one or more serpentine minerals, formed when ultramafic rocks are metamorphosed. This rock type is commonly associated with ultramatic rock along faults such as the Hayward Fault. Small amounts of chrysotile asbestos, a fibrous form of serpentine minerals, are common in serpentinite.), or asbestos (a term used for several types of naturally occurring fibrous materials found in many parts of California). The BAAQMD implements the regulation. As discussed in Subsection 8.15, Geologic Hazards and Resources, the SFERP site is located in the Hunters Point Shear Zone within the Franciscan Complex. Bedrock within this zone is primarily comprised of serpentinite. Alluvial deposits that overlay the Franciscan bedrock at the site were derived from topographic highs around the site that would also be comprised of serpentinite-containing bedrock. Artificial fill used at the site may have also been derived from this bedrock. If asbestos is present in the fill or bedrock that will be excavated for this project, the Asbestos ATCM would apply.

8.13.2.3 Local

8.13.2.3.1 Nonhazardous Solid Waste Management. The San Francisco Department of Public Health (SFDPH) will be responsible for administering and enforcing Article 6 of the San Francisco Health Code for solid, nonhazardous waste produced during construction and operation of the SFERP. The project will also implement source reduction and recycling efforts to help San Francisco meet its goal of 75 percent landfill diversion by 2010 in accordance with Resolution 679-02; and zero waste production by 2020 in accordance with Resolution 002-03-COE.

8.13.2.3.2 Hazardous Waste and Closure. Hazardous waste management will be subject to the requirements of Article 22 of the San Francisco Health Code, Hazardous Waste Management. This article authorizes the SFDPH to implement the requirements of the HWCL related to hazardous waste generators in San Francisco. In accordance with this article, the SFDPH has the authority to conduct inspections of any facilities where hazardous wastes are stored, handled, processed, disposed of, or treated to recover resources and must maintain records to document compliance with the HWCL.

Hazardous wastes generated at the facility would be described in the Certificate of Registration and Hazardous Materials Plan prepared for the facility in accordance with Article 21 of the San Francisco Health Code. This article is described in more detail in Subsection 8.12, Hazardous Materials. Section 1154 of Article 21 also specifies requirements

for closure of the facility. In accordance with Article 22, the SFPUC would prepare and implement the required closure plan.

8.13.2.3.3 Discharge of Wastewater. The discharge of nonhazardous wastewater would be subject to the requirements of Article 4.1 of the San Francisco Public Works Code and the San Francisco Department of Public Works Order No. 158170 that regulate the quantity and quality of industrial discharges to the combined sewer system. In accordance with these requirements, a Class I discharge permit from the Department of Public Works would be required. In addition, under this ordinance, any dewatering effluent produced during construction would require a permit for discharge to the combined sewer system. The requirements of Article 4.1 and Order 158170 are described in more detail in Subsection 8.14, Water Resources.

8.13.2.3.4 Requirements for Site Investigation. Soil and groundwater sampling and analysis were performed for the "Final Site Characterization/Corrective Measures Study (SFC/CMS) and Article 22A Characterization Report" (AGS, Inc., 1999) and included the SFERP site, but the data was not presented in the CMS. This data was subsequently presented in the "Human Health and Ecological Risk Assessment" (Geomatrix Consultants, 2000), which was approved by the RWQCB and led to a deed restriction for the nearby Port property. This deed restriction requires owners or lessees of the property to comply with a site-specific Final Risk Management Plan and Site Management Plan (RMP/SMP), MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway (AGS, Inc., 2000). The City is currently in discussions with the San Francisco Bay RWQCB to have the RMP/SMP also apply to site development and maintenance of the SFERP site. Under the RMP/SMP, the following general risk management practices must be taken before, during, and after development of the MUNI site:

- Provide site security.
- Develop and implement a site-specific health and safety plan prior to any development activities at the site.
- Provide adequate dust control measures during construction.
- Minimize groundwater contact by construction workers.
- After site development maintain covering on the site (asphalt or two feet of clean fill), implement management protocols for future subsurface development, maintain groundwater use restrictions, and agency notification in the event of a change in property use.

A copy of the Final Risk Management Plan and Site Management Plan (RMP/SMP), MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility is provided in Appendix 8.13A.

Because the proposed location of the SFERP and much of the wastewater line are located bayward of the historic tideline and would involve the disturbance of greater than 50 cubic yards of soil, Article 22A of the San Francisco Health Code, implemented by the SFDPH, would apply to construction of the SFERP. This article protects the health and safety of the workers, residents, and occupants from risks associated with hazardous wastes in the soil

by requiring a site assessment and mitigation of any risks identified as a condition for construction of a planned project. The requirements would be triggered by the building permit application or equivalent process (the City and County of San Francisco is not subject to the Building Code). While a building permit will not be required for the SFERP, the project will comply with the requirements of Article 22A prior to the start of ground disturbance or construction.

8.13.2.3.5 Codes. The design, engineering, and construction of hazardous waste storage and handling systems will be in accordance with all applicable codes and standards, including:

- The Uniform Fire Code
- The Uniform Building Code
- The Uniform Plumbing Code
- California Building Code
- California Fire Code
- San Francisco Municipal Code

8.13.3 Environmental Condition of Site

The proposed SFERP site is located on the Former Western Pacific Railroad (WPRR) Yard, which lies in an area reclaimed from the Bay in the Islais Creek Estuary. The WPRR Yard operated as a switchyard for rail cars brought across the bay on the ferry from Oakland. According to the Final Risk Management Plan and Site Management Plan prepared by AGS in 2000, major maintenance was not performed at the facility, although there was both a Railroad Engine House and Repair Track Building (AGS, Inc. 2000). Major maintenance likely occurred at facilities in Oakland and Stockton, California. Most of the rail cars at the site contained dry goods, although there were some tank cars used by the Cargill Coconut Oil Operation. Refueling operations for the train engines did occur at the yard, but not in the location of the proposed SFERP site (AGS, Inc., 2000).

In 1987 a site characterization study was conducted by Dames & Moore, and several unlabeled drums and containers were found throughout the entire WPRR Yard. The drums were subsequently sampled, removed, and disposed of offsite. Site investigations of the soil and groundwater at the site were conducted in 1999 by AGS Inc, at the location of the proposed MUNI Maintenance and Operations Center, located to the west of the proposed SFERP facility (AGS, Inc., 2000).

Investigations conducted in 1999 by AGS, Inc. at the adjacent MUNI Operations and Maintenance Center, concluded that localized areas of soil and groundwater have been affected by chemical releases from past activities. The chemicals of concern in the soil include petroleum hydrocarbons (diesel), at a maximum concentration of 1,730 milligrams per kilogram (mg/kg) (unsaturated soil); motor oil at a maximum concentration of 10,600 mg/kg (saturated soil); Bunker C-oil at a maximum concentration of 16,400 mg/kg (saturated soil); arsenic at a maximum concentration of 591 mg/kg; and lead at a maximum concentration of 2530 mg/kg. Both arsenic and lead are above background and EPA Region IX industrial Preliminary Remediation Goal (PRG) levels (AGS, Inc., 2000). The chemicals of concern identified in the groundwater include petroleum hydrocarbons (diesel) at a maximum concentration of 3240 μg/L; motor oil at a maximum concentration of 10,400 μg/L; Bunker C-

oil at a maximum concentration of 2310 μg/L; lead (filtered) at a maximum concentration of 48.1 μg/L; and arsenic (filtered) at a maximum concentration of 25.2 μg/L (AGS, Inc., 1999).

It is likely that similar chemical releases occurred at the proposed SFERP site, because it was used as a railroad switchyard and it is located adjacent to the proposed MUNI facility which has been investigated and found to have contamination.

8.13.4 Project Waste Generation

Waste will be generated at the site during facility construction and operation. Types of waste will include nonhazardous solid waste, groundwater produced during dewatering, nonhazardous wastewater, and liquid and solid hazardous waste.

8.13.4.1 Construction Phase

During construction, the primary wastes generated will be solid nonhazardous waste. However, some nonhazardous liquid waste and both solid and liquid hazardous waste will also be generated. The types of waste and their estimated quantities are described below.

8.13.4.1.1 Soil. Potentially contaminated soil would be excavated during construction of the SFERP facilities. It is anticipated that this soil will remain onsite and be used for grading and elevation purposes and ultimately covered and maintained in accordance with the RMP/SMP prepared for the MUNI site. As discussed in Subsection 8.13.3, previous sampling has identified petroleum hydrocarbons, arsenic and lead in the soil adjacent to the SFERP project boundaries (AGS, Inc., 2000). It is likely that some of the soil that would be excavated for construction of the project could contain these chemicals and could require specific storage and handling requirements during construction.

Asbestos-Containing Soil. Excavation for construction of the SFERP could encounter bedrock or fill materials containing naturally occurring asbestos. Should naturally occurring asbestos-containing materials be excavated, the requirements of the Asbestos Airborne Toxics Control Measure would apply. The requirements of this measure are discussed in Subsection 8.13.6.1.2.

8.13.4.1.2 Nonhazardous Solid Waste. Potential nonhazardous solid waste streams and their estimated volumes are described below. Recycling goals and disposal requirements for nonhazardous solid wastes produced during construction are discussed in Subsection 8.13.6.1.3.

Paper, Wood, Glass, and Plastics. Paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers. Approximately 10 tons of these wastes will be generated during project construction.

Metals. Waste metals will include welding/cutting operations during construction, packing materials and empty nonhazardous chemical containers. Aluminum waste will be generated from packing materials and electrical wiring. Approximately 15 tons of waste metal could be generated during construction.

8.13.4.1.3 Wastewater. Wastewater generated during construction will include sanitary waste, stormwater runoff, equipment washdown water, waste water from pressure testing the gas supply line after it is constructed, and water from excavation dewatering during construction (if dewatering is required). Depending on the chemical quality of these wastewaters, they

could be classified as hazardous or nonhazardous. As discussed in Subsection 8.13.6.1.3, the waste waters would be sampled and if they are hazardous would be disposed of as described in Subsection 8.13.6.1.4. Methods for disposing of nonhazardous wastewaters are identified in Subsection 8.13.6.1.3.

8.13.4.1.4 Hazardous Waste. Most of the hazardous waste generated during construction will consist of liquid waste, such as flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste such as welding materials, dried paint from construction activities, and possibly asbestos-containing materials may also be generated. Flushing and cleaning waste liquid will be generated as pipes are cleaned and flushed. The volume of flushing and cleaning liquid waste generated is estimated to be one to two times the internal volume of the pipes cleaned. The quantity of welding, solvent, and paint waste is expected to be minimal. Wastewaters generated during construction could also be considered hazardous, if demonstrated so by sampling described in Subsection 8.13.6.1.2. Methods for recycling and disposal of hazardous wastes during construction are identified in Subsection 8.13.6.1.4.

8.13.4.2 Operation Phase

During facility operation, the primary waste generated will be nonhazardous wastewater. However, nonhazardous solid waste and varying quantities of both solid and liquid hazardous waste will also be generated periodically. The types of waste and their estimated quantities are discussed below.

8.13.4.2.1 Nonhazardous Solid Waste. SFERP will produce maintenance wastes typical of power generation facilities. These will include rags, turbine air filters, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers and small office operations. The quantity generated is estimated to be about 20 cubic yards per year. Recycling goals and disposal requirements for nonhazardous solid wastes are discussed in Subsection 8.13.6.2.1.

8.13.4.2.2 Nonhazardous Wastewater. As discussed in Subsection 8.14, Water Resources, process wastewater that will be produced during operation of the SFERP facility includes cooling tower blowdown, filter backwash, reverse osmosis concentrate, and plant drainage. Each of these process waste streams along with its expected flow rate is shown on the water balance diagram presented in Figure 2-5 and is described below. The descriptions address the ultimate discharge method for all wastewater streams produced. In addition to these process wastewater streams, the SFERP facility will generate sanitary sewage consisting of wastewater collected from sinks, toilets, and other sanitary facilities. The following sections describe these waste streams; disposal methods for the nonhazardous wastewater are discussed in Subsection 8.13.6.2.1.

Cooling Tower Blowdown. Cooling tower blowdown will consist of water circulated in the evaporative cooler system and residues of the water treatment chemicals added to the circulating water to control scaling and bio-fouling of the cooling tower and corrosion of the circulating water piping and condenser tubes. The blowdown will be discharged to the waste water collection system as required to maintain the level of dissolved solids of the cooling water within acceptable ranges; the number of cycles that the water is used for will be dictated by the water supply quality.

Power Cycle Makeup Treatment Wastes. Wastewater from the power cycle makeup water treatment system will consist of the reject stream from the reverse osmosis (RO) units, and backwash water from the ultra-filters (UF) upstream of the RO units. The UF and RO units are used to reduce the concentration of dissolved solids in the plant makeup water prior to use in the combustion turbine generator (CTG) system where the process water supply is treated in the electro deionization equipment. The UFs are used as pretreatment prior to the RO units to prevent RO membrane fouling.

The wastewater stream from the power cycle makeup water treatment system will contain (1) concentrated constituents of the recycled water; (2) residues of the chemicals added to the raw water to coagulate suspended solids prior to filtration; (3) chemicals added to the UF filtrate to eliminate free chlorine, which would damage the RO membranes; and (4) chemicals added to adjust pH for the control of membrane scaling. This water will be discharged to the waste water collection system.

Plant Drainage. Plant drainage will consist of area washdown, equipment leakage, and drainage from facility equipment areas. Water from these areas will be collected in a system of floor drains, sumps, and piping, and routed to the wastewater collection system. Drains that could contain oil or grease will be routed to the wastewater collection system through an oil/water separator.

There will be no discharge from the chemical tank containment areas to the waste collection system. As discussed in Subsection 8.12, Hazardous Materials, the chemical tank storage areas will be designed with containment facilities to contain potential spills. In the unlikely event of a chemical spill, the spill will be cleaned up onsite by plant personnel or by a separate contractor brought in to assist the plant with spill cleanup.

8.13.4.2.3 Hazardous Waste. Hazardous waste generated will include waste lubricating oil and spent lubrication oil filters from the combustion turbines and selective catalytic reduction (SCR) catalyst units. The catalyst units contain heavy metals that are considered hazardous. A list of anticipated hazardous wastes generated at the plant is presented in Table 8.13-2. Recycling and disposal requirements for hazardous wastes are discussed in Subsection 8.13.6.2.2.

TABLE 8.13-2
Hazardous Wastes Generated at the Facility During Operations

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Lubricating oil	Gas turbine lubricating oil system	Hydrocarbons	Small amounts from leaks and spills	Hazardous	Cleaned up using sorbent and rags – disposed of by certified oil recycler
Lubricating oil filters	Gas turbine lubricating oil system	Paper, metal, and hydro-carbons	Approximately 12 per year	Hazardous	Recycled by certified oil recycler
Laboratory analysis waste	Water treatment	Miscellaneous analysis reagent chemicals	Approximately 50 gallons per year	Hazardous	Recycled by certified recycler

TABLE 8.13-2
Hazardous Wastes Generated at the Facility During Operations

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Spent SCR catalyst units	SCR system	Metal and heavy metals, including vanadium	Catalyst changed out every few years	Hazardous	Recycled by SCR manufacturer or disposed of in Class I landfill
Oily rags	Maintenance, wipe down of equipment, etc.	Hydrocarbons, cloth	Approximately 800 rags per year	Hazardous	Recycled by certified oil recycler
Oil sorbents	Cleanup of small spills	Hydrocarbons	Approximately 200 pounds per year	Hazardous	Recycled or disposed of by certified oil recycler
Cooling tower sludge	Deposited in cooling tower basin by cooling water	Dirt from air, arsenic from water	200 lb/yr	Potentially hazardous, but usually not	Class II landfill if nonhazardous; Class I if hazardous
Chemical feed area drainage	Spillage, tank overflow, area washdown water	Water with water treatment chemicals	Minimal	May be hazardous if corrosive	Onsite neutralization, if required, then discharged to cooling tower basin

8.13.5 Waste Disposal Sites

Nonhazardous solid waste (often referred to as solid waste, municipal solid waste [MSW], or garbage) will be recycled or deposited in a Class III landfill, as described in Subsection 8.13.6. Hazardous wastes, both solid and liquid, will be transported to a permitted offsite treatment, storage, and disposal (TSD) facility for treatment or recycling, or will be deposited in a permitted Class I landfill. The following subsections describe the waste disposal sites available for disposal of SFERP wastes.

8.13.5.1 Nonhazardous Solid Waste

Approximately 25 tons of solid waste will be generated during construction of the SFERP and solid waste will continue to be generated during operation of the project. Other solid wastes will be recycled to the extent possible, and what can not be recycled will be disposed of at a permitted landfill as discussed below.

It is anticipated that all excavated soil will be used onsite for grading and elevation purposes. In the event that some of the excavated soil will not be reused onsite, classification of the soil for disposal purposes would be made on the basis of sampling completed once the soil is excavated and stockpiled. Soil that is determined to be nonhazardous on the basis of the sampling conducted could be suitable for reuse at a construction site or disposal at a regional disposal facility, depending on the chemical quality.

The City and County of San Francisco has an exclusive agreement with Waste Management, Inc. (WMI) for disposal of up to 15 million tons of municipal solid waste from San Francisco at Altamont Landfill, owned and operated by WMI. (The exclusive agreement with the Altamont Landfill covers only nonhazardous solid waste, as defined by 27 CCR § 20220 and

"inert waste" as defined by 27 CCR §20230. Waste that does not fall into these two categories is not subject to the exclusive agreement). As of December, 2003, approximately 10 million tons of that capacity had been used by the City leaving a balance of 5 million tons (Drew, 2003). (The agreement with WMI does not include construction and demolition debris. Thus, nonhazardous construction debris can be disposed of in any of the landfills described in Table 8.13-3.)

TABLE 8.13-3
Solid Waste Disposal Facilities

Landfill/MRF/ Transfer Station	Location	Class	Permitted Capacity,[a] (Cubic Yards)	Permitted Throughput[a] (Tons per Day)	Remaining Capacity[a] (Cubic Yards)	Estimated Closure Date[a]	Violation of Minimum State Standards Noted[b]
Altamont Landfill	Livermore, CA	III	58,900,000[c]	11,150	15,843,000	1/1/2005[c]	No
Kirby Canyon	San Jose, CA	III	36,400,000	2,600	57,271,507	12/31/2022	No
Ox Mountain Sanitary Landfill	Half Moon Bay, CA	III	37,900,000	3,598	44,646,148	1/1/2018	No
Norcal Waste Systems Ostrom Road Landfill, Inc.	Wheaton, CA	II/III	41,822,300	3,000	11,252,490	12/31/2066	No

[a] Based on CIWMB Solid Waste Inventory System Database (CIWMB, 2003b).
[b] Based on the CIWMB *Inventory of Solid Waste Facilities Violating State Minimum Standards* (CIWMB, 2003a).
[c] The official permitted capacity is 58,900,000 cubic yards and the estimated closure date on record with the state is January 1, 2005 (CIWMB, 2003b); however, Altamont Landfill currently has a Conditional Use Permit for an expanded capacity and is in the process of revising its Solid Waste Facility Permit to include this information (St. John, 2003).

San Francisco has reached the statewide goal of 50 percent recycling and currently disposes of approximately 700,000 to 800,000 tons of waste per year at Altamont Landfill through this contract. Efforts are underway to increase recycling rates in accordance with City Resolutions 679-02 and 002-03-COE.

According to the CIWMB, Altamont Landfill has a total capacity of 58.9 million cubic yards of refuse and the remaining capacity as of 2001 was 15.8 million cubic yards. The CIWMB indicates that the active Solid Waste Facility Permit expires in 2005. However, Altamont has obtained a Conditional Use Permit (CUP) for expanded facilities and is in the process of revising its Solid Waste Facility Permit to include an expanded area that would increase the permitted disposal capacity to 87.1 million tons (St. John, 2003). According to the CIWMB, there are no open enforcement actions against Altamont Landfill and no violations have been issued to this facility for the past 2 years (CIWMB, 2003b).

The exclusive agreement between the City and County of San Francisco and Waste Management, Inc. will expire once the total capacity of the agreement is reached. At the current disposal rate, the exclusive contract will expire by approximately 2010, although successful recycling efforts will extend the duration of this contract. The City and County of San Francisco is conducting a national search for additional landfill capacity in anticipation

of the expiration of the agreement with the Altamont Landfill. The search for a properly permitted landfill with the appropriate capacity is being performed in accordance with the City and County of San Francisco procurement requirements. Table 8.13-3 provides a list of nearby permitted landfills with significant remaining capacity that could be qualified candidates to fill the City and County of San Francisco future needs. Prior to the conclusion of its procurement process, the City and County of San Francisco will not know which landfill(s) will be used after the contract with the Altamont Landfill expires.

As discussed above, estimates of nonhazardous solid waste production are approximately 25 tons during construction and 20 tons per year during operation. Because the SFERP will incorporate a proactive recycling program to achieve the City and County recycling goals, and adequate landfill capacity exists for those wastes that cannot be recycled, disposal of solid nonhazardous waste will not be a constraint on SFERP development.

8.13.5.2 Hazardous Waste

Hazardous waste generated at the SFERP facility will be stored at the facility for less than 90 days. The waste will then be transported to a TSD facility by a permitted hazardous waste transporter. These facilities vary considerably in what they can do with the hazardous waste they receive. Some can only store waste, some can treat the waste to recover usable products, and others can dispose of the waste by incineration, deep-well injection, or landfilling. (Incineration and deep-well injection are not permitted in California.)

According to the California Department of Toxic Substances Control (DTSC), there are 37 facilities in California that can accept hazardous waste for treatment or disposal (DTSC, 2003a). For ultimate disposal, California has the three hazardous waste (Class I) landfills described below. The closest commercial hazardous waste disposal facility is the Kettleman Hills facility in Kettleman City.

8.13.5.2.1 Clean Harbors' (Formerly Safety-Kleen's) Buttonwillow Landfill in Kern County. This facility includes two active landfills. WMU-34 has a total capacity of 345,000 cubic yards and a remaining capacity of about 50,000 cubic yards; closure of this unit is expected in 2006. WMU-35 has a total capacity of 10,700,000 cubic yards and a remaining capacity of about 10,500,000 cubic yards; this unit is scheduled for closure in 2021 (Gius, 2004), however, the Buttonwillow facility is not expected to reach capacity until about 2040 at current disposal rates (Davis, 2004). This landfill is permitted to accept California and RCRA hazardous wastes.

8.13.5.2.2 Clean Harbors' (Formerly Safety-Kleen's) Westmorland Landfill in Imperial County. This facility includes one active landfill (LC-2) and two proposed landfills (LC-4, LC-5) which are permitted. LC-2 has a total capacity of 750,000 cubic yards and a remaining capacity of approximately 20,000 cubic yards; this unit is scheduled for closure in 2006. LC-4 is a permitted landfill that has not yet been constructed. It will have a total capacity of 870,000 cubic yards and is scheduled for closure in 2020. LC-5 is a permitted landfill that is scheduled for construction in 2005. It will have a total capacity of 1,860,000 cubic yards. LC-5 is scheduled for closure in 2013 (Gius, 2004). This disposal facility is permitted to accept California and RCRA hazardous wastes.

8.13.5.2.3 Waste Management's Kettleman Hills Landfill in Kings County. This facility accepts Class I, II (designated), and III waste. The Class I landfill is permitted for and will accept all

hazardous wastes except radioactive, compressed gases, medical, and unexploded ordinance (UXO); this landfill has permitted capacity of 10.7 million cubic yards with a remaining capacity of 7.3 million cubic yards as of June 2003 (DTSC, 2003b). The permitted closure date for the Class I landfill is June 30, 2013. The Class II and III waste disposal facility has a planned closure date of 2010. It is permitted to accept up to 1,400 tons per day of solid waste and contaminated soil and the total permitted capacity is 4.2 million cubic yards (CIWMB, 2003b). As of September 2001, the remaining capacity was 3.8 million cubic yards, however Chemical Waste Management is currently in the process of permitting an additional 15 million cubic yards of capacity at its Kettleman Hills facility (Yarbrough, 2004).

8.13.5.2.4 Additional Commercial Hazardous Waste Treatment and Recycling Facilities. In addition to hazardous waste landfills, there are numerous offsite commercial liquid hazardous waste treatment and recycling facilities in California. Some of the closest facilities include ECS Refining in Santa Clara, Romic Environmental Technologies Corporation in East Palo Alto, Clean Harbors in San Jose, Micro Metallics Corporation in San Jose, Metech International, Inc. in Gilroy, Evergreen Oil, Inc. in Newark, Wit Refining in San Jose, Technichem in Emeryville, AERC.com, Inc. in Hayward, and Ionization Research Company, Inc. in Milpitas (DTSC, 2003a).

Because the project would emphasize recycling of hazardous wastes and adequate disposal and treatment facility capacities exist, disposal of solid and liquid hazardous wastes during construction and operation, including any soil that is classified as a hazardous waste, determined as in Subsection 8.13.6.1.2, will not be a constraint on SFERP development.

8.13.6 Waste Management Methods and Mitigation

The handling and management of waste generated by the SFERP will follow the hierarchical approach of source reduction, recycling, treatment, and disposal. The first priority will be to reduce the quantity of waste generated through pollution prevention methods (e.g., high-efficiency cleaning methods). The next level of waste management will involve reusing or recycling wastes (e.g., used oil recycling). For wastes that cannot be recycled, treatment will be used, if possible, to make the waste nonhazardous (e.g., neutralization). Finally, offsite disposal will be used to dispose of residual wastes that cannot be reused, recycled, or treated.

To ensure compliance with this strategy as well as legal handling and disposal of all wastes, the City will prepare separate waste management plans for the construction and operation phases of the project. The plans will include a description of all waste streams including projections of generation frequency, amounts generated, and hazard classifications. In addition, the methods for managing each waste will be identified including treatment methods and companies contracted with for treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans. The following subsections present requirements for waste handling and disposal that will be included in the waste management plans and a description of how the project will comply with Article 22A of the San Francisco Health Code.

8.13.6.1 Construction Phase

Wastes produced during construction will include nonhazardous solid wastes, nonhazardous wastewater, hazardous solid and liquid wastes, and potentially, soil excavated for construction of the project facilities that is not then reused onsite.

8.13.6.1.1 Soil

Article 22A Compliance and Soil Management and Disposal. As described in Subsection 8.13.3, the SFERP facility will be constructed within an area which has the potential to contain contaminated soil. Because the project, including the SFERP location and portions of the wastewater line, is located bayward of the historic high tide line and would involve the excavation of greater than 50 cubic yards of soil, Article 22A of the San Francisco Health Code would apply. The requirements would be triggered by the building permit application or equivalent process (the City and County of San Francisco is not subject to the building code requirements for building permits). Major requirements, many of which may already have been fulfilled by previous investigations and documents, include:

- Preparation of a site history report to describe past site uses and identify whether the site is listed as a hazardous waste site pursuant to state or federal regulations.
- Implementation of a soil investigation to evaluate the potential presence of hazardous wastes in the soil.
- Preparation of a soil analysis report that evaluates the results of chemical analysis of the soil samples.
- Preparation of a site mitigation report, if contamination is identified, assessing potential environmental and health and safety risks, recommending measures to mitigate the risks, identifying appropriate waste disposal and handling requirements, and presenting criteria for on-site reuse of soil.
- Preparation of a certification report stating that either (1) no hazardous wastes present in the soil present an unacceptable risk and that no mitigation measures are required; or (2) all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified through follow-up soil sampling and analysis, if required.

A site history report will be prepared for both the project site, and for those portions of the wastewater line located bayward of the historic high tide line. A project-specific soil analysis report(s) will be required to identify the concentration of chemicals present in the soil at the SFERP location and along the wastewater pipeline alignment that would be excavated for construction. Any additional report(s) will be prepared by knowledgeable, certified professionals and will be submitted to the SFDPH and the SFBRWQCB per the RMP/SMP.

A deed restriction is currently in place for the MUNI property. This deed restriction requires that owners or lessee's of the property to comply with a site-specific RMP/SMP. Under the RMP/SMP (that is administered by the San Francisco Bay RWQCB), the following general risk management practices must be taken before, during, and after development of the MUNI subsite:

- Provide site security.

- Develop and implement a site-specific health and safety plan prior to any development activities at the site.
- Provide adequate dust control measures during construction.
- Minimize groundwater contact by construction workers.
- After site development, maintain covering on the site (asphalt or two feet of clean fill), implement management protocols for future subsurface development, and maintain groundwater use restrictions and agency notification in the event of a change in property use.

Assuming that the City and the SFBRWQCB agree on extending the MUNI RMP/SMP to the SFERP site, the RMP/SMP will be used during construction and future maintenance of the SFERP. The RMP/SMP (1) assesses potential environmental and health and safety risks; (2) recommends mitigation measures, if any are necessary, that would be protective of workers and visitors to the SFERP facility; (3) recommends measures to mitigate the risks identified; (4) identifies appropriate waste disposal and handling requirements; and (5) presents criteria for on-site reuse of soil. If required, the recommended measures will be completed during construction and upon completion, the City will prepare a certification report stating that all mitigation measures recommended in the site mitigation report have been completed and that completion of the mitigation measures has been verified.

The construction contract for the project will also include a provision that if previously unidentified areas of contamination are identified during construction, as indicated by discolored soil, odor, or some other condition, the contractor shall have a soil sample taken and submitted for laboratory analysis and stop work in that particular area until the results of the soil sample are known and proper material handling instructions can be determined.

Waste Classification and Disposal. As noted previously, it is anticipated that all of the potentially contaminated soil excavated during construction will be reused on site in accordance with the RMP/SMP. In the event that some of the excavated soil cannot be reused on site and requires offsite disposal, the excavated soil will be classified in accordance with the waste classification requirements of Title 22 of the California Code of Regulations. Under Title 22, a waste is considered hazardous waste if it exhibits the characteristics of ignitability, corrosivity, reactivity, or toxicity or organic substances at soluble concentrations greater than federal toxicity regulatory levels using a test method called the toxicity characteristic leaching procedure (TCLP); if it contains total concentrations of certain substances at concentrations greater than the total threshold limit concentration (TTLC) or soluble concentrations greater than the soluble threshold limit concentration (STLC); if it contains specified carcinogenic substances at a single or combined concentration of 0.001 percent; or if toxicity testing indicates toxicity greater than specified criteria. The TCLP, TTLC, and STLC criteria are summarized in Table 8.13-4 with the maximum concentration of each chemical previously identified in the soil at the proposed MUNI Operations and Maintenance Center adjacent to the SFERP facility.

TABLE 8.13-4
Maximum Detected Concentrations at the Proposed MUNI Operations and Maintenance Center

		Waste Disposal Criteria		
Metal	**Maximum Concentration, mg/kg**	**Regulatory Level[a] (mg/L)**	**TTLC[b] (mg/kg)**	**STLC[c] (mg/L)**
Arsenic	591	5	500	5
Lead	2,530	5	1,000	5

[a] The regulatory level refers to the soluble concentration of a waste constituent determined using the toxicity characteristic leaching procedure (TCLP). A waste would be considered hazardous by federal regulations if the soluble concentration of a chemical in the TCLP extract exceeded the federal regulatory level specified. Because the TCLP involves a 20-to-1 dilution of the sample, the total concentration of a substance in the soil would need to exceed 20 times the regulatory level for the soluble concentration to possibly be greater than the regulatory level in the extract.

[b] TTLC = total threshold limit concentration. A waste would be considered hazardous by state regulations if the total concentration of a chemical exceeded the TTLC.

[c] STLC = soluble threshold limit concentration. A waste would be considered hazardous by state regulations if the soluble concentration of a chemical exceeded the STLC determined by a waste extraction test which involves a 10-to-1 dilution of the sample. Because of this, the total concentration of a substance would need to exceed 10 times the regulatory level for the soluble concentration to possibly exceed the STLC.

The maximum soil concentrations identified in Table 8.13-4 are based on the maximum concentration identified in a single sample obtained as part of previous investigations at the proposed MUNI site adjacent to the SFERP project. It is likely that these concentrations are representative of the soil from small portions of the project site; larger quantities of soil excavated for construction of the proposed buildings would likely exhibit different chemical concentrations. The required disposal method for contaminated soil that is not reused on site would be dependent on sampling of the soil once it is excavated and stockpiled to determine its characteristics. Soil classified as hazardous would require disposal at a Class I disposal facility. Class I land disposal facilities can accept hazardous wastes with chemical levels below the federal land disposal restriction (land ban) treatment standards or wastes meeting SFBWRCB designated waste criteria. Class II and III facilities can accept non-hazardous wastes that meet acceptance criteria determined by the state for organic and inorganic compounds. Each landfill has individual acceptance criteria and the appropriate disposal site for a waste will be determined on the basis of the classification of the waste and individual landfill acceptance criteria. Class II and III landfills in the Bay Area have acceptance criteria for lead that are lower than the TCLP or STLC.

Title 40 of the Code of Federal Regulations, Section 268.40, and Title 22 of the California Code of Regulations, Chapter 18, Article 3 identify specific hazardous wastes that are restricted from land disposal. A prohibited waste identified in these regulations may be land disposed only if it meets specified treatment standards. If the soil excavated during construction of the SFERP facility that is not then reused onsite exhibited the characteristic of toxicity for lead based on the TCLP, the soil would need to be treated to reduce soluble lead concentrations. The universal treatment standard (UTS) for wastes containing lead is 0.75 mg/L as measured by TCLP. However, Title 40 of the Code of Federal Regulations, Section 268.49 specifies alternative LDR treatment standards for contaminated soil. The alternative treatment standards specify that, prior to placement in a land disposal unit, all constituents subject to treatment must achieve a 90 percent reduction in constituent

concentrations or a reduction in constituent concentrations to less than 10 times the UTS. In the case of soils exhibiting the toxicity characteristic for lead, the alternate soil treatment standard would be 7.5 mg/L. Other UTS could apply, depending on the concentration of specific chemicals in the soil and the soil could also contain Underlying Hazardous Constituents (UHCs) defined in Title 40 of the Code of Federal Regulations, Section 268.48, which could require treatment to UTSs. Treatment must be conducted by a DTSC permitted contractor or utilizing a DTSC permitted treatment unit.

The California Health and Safety Code, Section 25157.8 also specifies that waste disposed in California that contains lead in excess of 350 ppm can only be disposed in a Class I hazardous waste disposal facility, unless the RWQCB issues a variance to the waste disposal facility for the acceptance of the waste, modifies the waste disposal facility's permit to accept the waste, amends the waste disposal facility's waste discharge requirements to specifically allow disposal of the waste, or approves disposal of the waste at the site of generation.

Soil with total petroleum hydrocarbon concentrations above the detection limit must be disposed of at an appropriate landfill facility or treated to reduce the levels of petroleum hydrocarbons in the soil. In general, soil with total petroleum hydrocarbon levels up to 100 milligrams per kilogram (mg/kg) can be disposed of at a Class III disposal facility. If the concentration is between 100 and 1,000 mg/kg, it can be disposed of at a Class II disposal facility; and if the concentration is greater than 1,000 mg/kg, Class I disposal would be required.

Storage Requirements. Section 8.0 of the RMP/SMP provides the requirements for site management during construction. The site management protocols to be implemented during site development will include requirements for site security, stormwater and dewatered water (if required) runoff controls, and soil management requirements (e.g., covering stockpiled soils, managing runoff).

Asbestos-Containing Soil. The CARB Asbestos ATCM would apply to excavation within rock or soil containing naturally occurring asbestos. If the project disturbs one acre or less of asbestos-containing materials, the City will implement standard dust mitigation measures specified in the ATCM before construction begins, and maintain each measure throughout the duration of the construction project. If the project disturbs more than one acre of asbestos-containing materials, the City will prepare an asbestos dust mitigation plan specifying measures that would be taken to ensure that no visible dust crosses the property boundary. The asbestos dust mitigation plan will be submitted to and approved by the BAAQMD prior to the beginning of construction, and the City will ensure the implementation of all measures throughout the construction project. In addition, the BAAQMD may require air monitoring to monitor for offsite migration of asbestos dust during construction activities and may change the plan on the basis of the air monitoring results.

8.13.6.1.2 Nonhazardous Solid and Liquid Wastes

Solid Wastes. The City will contract with a hauler and require that disposal of the waste be undertaken in accordance with applicable laws. During construction, a private waste hauler retained by the general contractor would pick up non-hazardous debris. The City would require the hauler to meet the City recycling goals in the construction contracts prepared for

the project. Nonrecyclable materials would be disposed of at a regional solid waste disposal facility.

Wastewater. Sanitary waste will be collected in portable, self-contained toilets. Stormwater runoff will be managed in accordance with an Erosion and Sediment Control Plan prepared for the project and approved by the San Francisco Bureau of Environmental Regulation and Management prior to the start of construction as discussed in Subsection 8.14, Water Resources.

Other wastewaters produced during construction could be considered hazardous depending on the concentration of specific chemicals identified. The wastewaters would be sampled and, if characterized as hazardous, would be disposed of as a hazardous waste as described in Subsection 8.13.6.1.3. If the wastewater is not hazardous, it would be discharged to the combined sewer system in accordance with permit requirements issued by the City discussed in Subsection 8.14, Water Resources; the water would be treated prior to discharge to the sewer, if substances are present at concentrations greater than the City's permit requirements.

8.13.6.1.3 Hazardous Liquid and Solid Wastes. All wastes generated by the construction contractor will be handled in compliance with all applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, and reporting and record keeping. The hazardous waste will be collected in satellite accumulation containers near the points of generation. This waste will be moved daily to the contractor's 90-day hazardous waste storage area, located at the plant construction laydown area. The waste will be transported to a permitted hazardous waste management facility by licensed waste haulers, before expiration of the 90-day storage limit. Waste handling facilities and activities will be subject to inspection by the SFDPH in accordance with Article 22 of the San Francisco Health Code to ensure that handling of hazardous wastes is in accordance with applicable laws and regulations. Hazardous wastes generated during construction will also be disclosed in the Certificate of Registration and Hazardous Materials Business Plan prepared in accordance with Article 21 of the San Francisco Health Code which are further described in Subsection 8.12, Hazardous Materials.

8.13.6.2 Operation Phase

Handling requirements and mitigation measures for the handling of wastes during operation are described in the following subsections. In addition, requirements for the management of any hazardous wastes in the soil following construction are identified.

8.13.6.2.1 Nonhazardous Solid and Liquid Wastes

Solid Wastes. For disposal of nonhazardous solid wastes during operation, the City will identify waste collection methods to work towards the City and County goals of 75 percent recycling by 2010 and 100 percent recycling by 2020 (Malatesta, 2003). This will include incorporating recycling facilities directly into the project design and development of the best management approach to achieve the recycling goals of the City.

Nonhazardous Wastewater. Process wastewater collected in the wastewater collection system and sanitary sewage from the SFERP facility will be discharged to the SEWPCP in accordance with Article 4.1 of the San Francisco Public Works Code. The wastewater will be

discharged via a connection to the San Francisco combined sewer system on 25th Street under a permit from the City, as described in Subsection 8.14, Water Resources.

8.13.6.2.2 Hazardous Wastes. In accordance with the Hazardous Waste Source Reduction and Management Review Act, the City will develop a Hazardous Waste Source Reduction and Evaluation Plan identifying methods to reduce hazardous waste generation if threshold quantities of hazardous waste are generated. Hazardous waste generation and storage will comply with the requirements of Article 22 of the San Francisco Health Code and applicable federal and state laws. Compliance with these laws will avoid potential effects on human health and the environment from handling and disposing of hazardous wastes. The following general procedures will be employed in accordance with applicable laws:

- The SFERP will be classified as a hazardous waste generator and the City will obtain a site specific Cal-EPA ID number that will be used to manifest hazardous waste from the SFERP facility. Hazardous waste from the SFERP facility will be stored onsite for less than 90 days before offsite disposal, treatment, or recycling.
- Hazardous wastes will be accumulated at the generating facility according to CCR Title 22 requirements for satellite accumulation.
- The hazardous waste storage area will be constructed in accordance with applicable hazardous materials regulations discussed in Subsection 8.12, Hazardous Materials. Provisions for storage include appropriately segregated storage areas surrounded by berms to contain leaks and spills. The bermed areas will be sized to hold the full contents of the largest single container and, if not roofed, sized to allow for the rainfall from a 24-hour, 25-year storm. These areas will be inspected daily.
- Hazardous wastes will be collected by a licensed hazardous waste hauler, using a hazardous waste manifest. Wastes will only be shipped to authorized hazardous waste management facilities. Biannual hazardous waste generator reports will be prepared and submitted to the DTSC. Copies of manifests, reports, waste analyses, and other documents will be kept on-site and will remain accessible for inspection for at least 3 years.
- Employees will be trained in hazardous waste handling procedures, spill contingencies, and waste minimization.
- Procedures will be developed to reduce the quantity of hazardous waste generated. Nonhazardous materials will be used instead of hazardous materials whenever practical, and wastes will be recycled whenever practical.

Specifically, hazardous waste handling will include the following practices. Handling of hazardous wastes in this way will minimize the quantity of waste deposited to landfills:

- Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor, such as Evergreen Oil, Inc.
- Spent oil filters and oily rags will be recycled.
- Spent SCR catalysts will be recycled by the supplier, if possible, or disposed of at a State-certified treatment and disposal facility.

- Laboratory analysis wastes will be recycled or treated, if possible, or disposed of in a Class I landfill.

Waste handling facilities and activities at the SFERP facility will be subject to inspection by the SFDPH in accordance with Article 22 of the San Francisco Health Code to ensure handling of hazardous wastes in accordance with applicable laws and regulations. As discussed in Subsection 8.12, the facility will be required to file a Certificate of Registration and develop a Hazardous Materials Business Plan (overseen by the SFDPH) that documents all hazardous materials/wastes stored, used, and disposed of at the site.

8.13.6.3 Facility Closure

When the SFERP facility is closed, both nonhazardous and hazardous wastes must be handled properly. Closure can be temporary or permanent. Temporary closure would be for a period of time greater than the time required for normal maintenance, including overhaul or replacement of the combustion turbines. Causes for temporary closure could be a disruption in the supply of natural gas, flooding of the site, or damage to the plant from earthquake, fire, storm, or other natural causes. Permanent closure would consist of a cessation in operations with no intent to restart operations and could result from the age of the plant, damage to the plant beyond repair, economic conditions, a policy decision by the City, or other unforeseen reasons. Handling of wastes for these two types of closure are discussed below.

8.13.6.3.1 Temporary Closure. For a temporary closure, where there is no release of hazardous materials, facility security will be deployed on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. This plan will be prepared as described in the plant closure section. The plan will be developed to ensure conformance with all applicable LORS and the protection of public health and safety and the environment. The plan, depending on the expected duration of the shutdown, could include draining all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Subsection 8.13.2.

Where the temporary closure is in response to facility damage, or where there is a release or threatened release of hazardous waste or materials into the environment, procedures will be followed as set forth in a hazardous materials business plan (HMBP), described in Subsection 8.12.8.2.1, or a risk management plan (RMP), described in Subsection 8.12.8.2.2. Procedures to be implemented include methods to control releases, notification of applicable authorities and the public, emergency response, and training for generating facility personnel in responding to and controlling releases of hazardous materials and hazardous waste. Once the immediate problem of the release is contained and cleaned up, temporary closure will proceed as described for a closure where there is no release of hazardous materials or waste.

8.13.6.3.2 Permanent Closure. When the facility is permanently closed, the SFPUC will prepare a closure plan in accordance with the requirements of Section 1154 of Article 21 of the San Francisco Health Code. The plan will address the need for further maintenance of the closed facility; address methods to ensure that the threat to public health and the

environment from residual hazardous materials is eliminated; and address methods to ensure that hazardous materials used at the facility are appropriately removed, disposed of, neutralized, or reused. The closure plan will be submitted to the SFDPH for approval a minimum of 30 days prior to closure and at that time, the SFDPH may add additional requirements for closure. The requirements specified in this closure plan will be incorporated into the general closure plan prepared for the facility that will attempt to maximize the recycling of facility components (see Section 4.0). Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to protect public health and safety, and the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the SFERP decommissioning activities.

8.13.7 Cumulative Impacts

The SFERP facility will generate nonhazardous solid waste that will add to the total waste generated in San Francisco County and in California. However, the facility will implement measures to comply with the City and County of San Francisco recycling goals of 75 percent recycling by 2010 and 100 percent recycling by 2020. Implementation of these measures would reduce the requirement for landfilling of wastes and there is adequate landfill capacity to accommodate the disposal of nonrecyclable materials until 2020 when all wastes would be recycled. With achievement of these recycling goals, it is estimated that SFERP will generate approximately 14,750 tons of solid waste for disposal during construction, and about 5 tons a year from operations until 100 percent recycling is achieved in 2020. Compared to the total amount of 700,000 to 800,000 tons of solid waste landfilled from San Francisco County in the year 2002 (Drew, 2003), the SFERP contribution will represent a minimal contribution to the total county waste generation. Therefore, the impact of the project on solid waste recycling and disposal capacity is not significant.

Hazardous waste generated will consist of waste lubricating oil, filters, and rags; spent SCR catalysts; and laboratory analysis wastes. The City will comply with the stringent LORS requirements for generation and handling of hazardous wastes, including source reduction, recycling, treatment and disposal. Further, the quantities of hazardous waste generated during construction and operation are small. Compared to the approximately 20-million-cubic-yard existing and anticipated capacity of the existing hazardous waste disposal facilities, the disposal capacity in California for hazardous wastes is more than adequate. Therefore, the effect of SFERP on hazardous waste recycling, treatment, and disposal capability is not significant.

8.13.8 Monitoring

The City will incorporate reporting requirements into the waste collection contract requiring reporting to demonstrate compliance with City waste diversion goals. Compliance with requirements for discharge of nonhazardous wastewater during construction and operation would be tracked through regular reporting to the San Francisco Department of Public Works in accordance with Article 4.1 of the Public Works Code, described in Subsection 8.14, Water Resources.

Hazardous waste reduction efforts will be documented in the hazardous waste performance report required by the Hazardous Waste Source Reduction and Management Review Act of 1989, if threshold quantities of hazardous waste are generated. Hazardous waste handling at the site will be subject to regular inspections by the SFDPH, the CUPA (Certified Unified Program Agency) for the City and County of San Francisco, which could cite the facility for noncompliance with applicable regulatory requirements. Any hazardous wastes shipped for off-site disposal or treatment will be manifested in accordance with state and federal laws, and the DTSC will confirm legal disposal or recycling of the hazardous wastes through reconciliation of waste manifests.

Compliance with site mitigation requirements will be documented in the certification report submitted to the SFDPH, DTSC, and SFBRWQCB for review and approval upon completion of the site mitigation. Containment measures (such as a cap) instituted to prevent exposure to potential hazardous constituents left in the soil and groundwater during operation would include implementation of a maintenance plan and specific activities described in the MUNI RMP/SMP, and notification of the SFDPH and SFBRWQCB if the containment measures are to be disturbed. These measures would provide the monitoring required to ensure that unacceptable exposure to hazardous constituents in the soil and groundwater does not occur during operation.

8.13.9 Involved Agencies

Several agencies, including USEPA at the federal level and the DTSC and SFBRWQCB at the state level, regulate nonhazardous and hazardous waste and will be involved in the regulation of the waste generated by the SFERP. The waste laws, however, are administered and enforced primarily through the SFDPH, which is the designated CUPA for San Francisco. Recycling of non-hazardous waste is managed by the San Francisco Department of the Environment. The persons to contact for nonhazardous and hazardous waste management are listed in Table 8.13-5.

TABLE 8.13-5
Agency Contacts for SFERP Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Nonhazardous Waste					
Solid Waste	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Henry Louie	Local Enforcement Agency Program Manager	(415) 252-3980
Recycling	San Francisco Department of the Environment	11 Grove St. San Francisco, CA	Kevin Drew	Residential and Special Projects Recycling Coordinator	(415) 355-3732

TABLE 8.13-5
Agency Contacts for SFERP Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Hazardous Waste					
Hazardous Waste Compliance and Inspections	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Sue Cone	Program Manager	(415) 252-3991
Article 22A Compliance	San Francisco Department of Public Health	1390 Market St., Suite 210 San Francisco, CA 94102	Stephanie Cushing	Program Manager	(415) 252-3926

8.13.10 Permits Required and Permit Schedule.

The storage of hazardous wastes at the SFERP facility would be included in the HMBP submitted to the SFDPH as described in Section 8.12, Hazardous Materials. In addition, the San Francisco Fire Department could require the permits listed in Table 8.13-6.

TABLE 8.13-6
Permits Required and Permit Schedule for SFERP Waste Management

Permit	Applicability	Schedule for Permit
Hazardous Materials Use and Storage Permit	California Fire Code requires that businesses obtain permits for the use and storage of specified hazardous materials.	Before storing regulated hazardous wastes at the site.

8.13.11 References

AGS, Inc. 1999. *Final Site Characterization/Corrective Measure Study and Article 22A Soil Characterization Report, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility, San Francisco Municipal Railway.* December.

AGS, Inc. 2000. *Final Risk Management Plan and Site Management Plan, MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility San Francisco Municipal Railway.* February.

California Air Resources Board (CARB). 2002. *Asbestos Airborne Toxic Control Measure for Construction, Grading, Quarrying, and Surface Mining Operations.* July 29.

California Integrated Waste Management Board (CIWMB). 2003a. "Inventory of Solid Waste Facilities Violating State Minimum Standards." November 14.

California Integrated Waste Management Board (CIWMB). 2003b. Solid Waste Information System (SWIS) Database. December 16.

Davis, T. 2004. Personal communication between T. Davis, Clean Harbors Facility Compliance Manager and Mary McDonald of Orion Environmental Associates. June 25.

Drew, K. 2003. Personal communication between K. Drew, Residential and Special Projects Recycling Coordinator for the San Francisco Department of the Environment, and Mary McDonald of Orion Environmental Associates. December 16.

DTSC (Department of Toxic Substance Control). 2003a. *California Commercial Offsite Hazardous Waste Management Facilities.* October 20.

DTSC (Department of Toxic Substances Control). 2003b. Hazardous Waste Facility Permit for Chemical Waste Management, Incorporated, Kettlemen Hills Facility. Permit Number 02-SAC-03. June 16.

Geomatrix Consultants. 2000. Human Health and Ecological Risk Assessment. September.

Gius, F. 2004. Email from F. Gius of the Department of Toxic Substances Control to Mary McDonald of Orion Environmental Associates. February 11.

Malatesta, M. 2003. Personal communication between M. Malatesta, Operations Manager of the Roll Off Division, Golden Gate Disposal and Recycling, and Mary McDonald of Orion Environmental Associates. December 18.

St. John, M. 2003. Personal communication between M. St. John, Environmental Coordinator and Regulatory Specialist for Altamont Landfill, and Mary McDonald of Orion Environmental Associates. December 16.

Yarbrough, T. 2004. Personal communication between T. Yarbrough, Executive Assistant, Chemical Waste Management, and Mary McDonald of Orion Environmental Associates. June 25.

SUBSECTION 8.14

Water Resources

8.14 Water Resources

8.14.1 Introduction

This subsection evaluates the effect of the San Francisco Electric Reliability Project (SFERP) on water resources. Subsection 8.14.2 provides a brief introduction to San Francisco's combined sewer system, which is atypical in California and an important consideration in this subsection. Subsection 8.14.3 presents the LORS compliance strategy. Subsection 8.14.4 describes the affected environment. Subsection 8.14.5 presents the project's proposed water usage and wastewater disposal characteristics, and Subsection 8.14.6 discusses the project's effects on water resources. Mitigation is discussed in Subsection 8.14.7. Subsection 8.14.8 provides the proposed monitoring plans and compliance verification procedures. Subsection 8.14.9 discusses cumulative impacts. Subsection 8.14.10 lists the permits required and agency contacts. Subsection 8.14.11 provides the references consulted in preparing this subsection.

Water resources evaluated for potential effects by the proposed SFERP include the following, and are addressed in this subsection:

- Effects on water supply
- Effects on surface waters
- Effect of stormwater
- Effects on groundwater recharge, degradation, or depletion
- Effects on flooding

8.14.2 Background

The City of San Francisco (City) is the only major municipality in California with a combined sewer system, and it serves nearly the entire City. This means that throughout the City, domestic sewage, industrial wastewater, and stormwater runoff are collected in the same set of pipes where they are combined and transported to the same wastewater treatment facilities for treatment and disposal. Most other communities in California have a separated sewer system: one system for domestic sewage and industrial wastewater and another system for stormwater.

The City combined sewer system is subject to the regulations of, and permitted under, the National Pollutant Discharge Elimination System (NPDES) program of the Clean Water Act for the treatment and disposal of the combined wastewater. However, during wet weather, the NPDES permit indicates that the City's combined sewer system facilities are regulated under the Federal Combined Sewer Overflow Control Policy, and not the same regulations for publicly-owned treatment works or for stormwater as other California municipalities with separate systems. The City's combined sewer system is further described in Subsection 8.14.4, and federal, state, and local regulations applicable to the SFERP are discussed in Subsection 8.14.3.

8.14.3 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, and local laws, ordinances, regulations, and standards (LORS) applicable to water resources aspects of the SFERP are discussed in this subsection and summarized in Table 8.14-1.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Water Resources

LORS	Applicability	How Conformance Is Achieved
Federal		
Clean Water Act (CWA) / Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); National Pollutant Discharge Elimination System (NPDES) (CWA, Section 402); Toxic and Pretreatment Effluent Standards (CWA, Section 307)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all wastewater discharges, including industrial wastewater, stormwater runoff and dewatering, during both construction and operation. Sets forth pretreatment requirements for the industrial discharges into publicly-owned treatment works.	Compliance with state implementation requirements as indicated by the California Regional Water Quality Control Board, San Francisco Bay Region (see below under State).
State		
Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code, Sections 13000-14050), including Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)	Implements and enforces the federal NPDES permit program through conformance with beneficial uses and water quality objectives in the Basin Plan as well as conformance with any applicable Total Maximum Daily Load requirements and industrial pretreatment requirements.	Operational discharges of industrial and sanitary wastewater streams are conveyed to the City's combined sewer system for treatment and disposal; discharges from the City's combined sewer system to the Bay are regulated under an existing NPDES permit. Operational discharges of stormwater runoff from the site are conveyed to the City's combined sewer system for treatment and disposal; discharges to the Bay from the City's combined sewer system are regulated under an existing NPDES permit. Stormwater discharges directly to the Bay and into the Port's storm drainage system will take place from the staging area and prior to the installation of the onsite drainage system. These discharges would be subject to the Port's current NPDES permit conditions.
California Environmental Quality Act (CEQA) (Public Resources Code, 21000 et seq. and Guidelines, 14 Cal. Code Reg. 15000 et. seq.)	Identifies potential impacts to water quality and hydrology and mitigation measures for those impacts; discloses this information to decision makers and the public.	The California Energy Commission (CEC) Final Staff Assessments is the CEQA-equivalent documents under the Warren-Alquist Act.
California Water Code §13550 et seq. and State Water Resources Control Board Resolution 75-58	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply.	CA Water Code §13550 et seq. provides that use of potable water for specified uses is a prohibited waste of water resources when recycled water is currently available, as defined in that section. The SFERP proposes to use recycled water for process and cooling water and is, therefore, in conformance with these code sections. Res. No. 75-58 applies only to use of inland surface waters for cooling; but because the SFERP would use recycled water for cooling, this does not apply to this project.
Title 22 of the CCR (Division 4, Chapter 15)	Sets forth requirements for treatment and quality of recycled water for cooling.	Recycled water will be disinfected tertiary recycled water, in conformance with Title 22 requirements.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to SFERP Water Resources

LORS	Applicability	How Conformance Is Achieved
Local		
San Francisco Public Works Code, Article 4.1, Industrial Waste	Regulates all discharges to the City's combined sewer system, including industrial wastewater, stormwater runoff, and dewatering effluent.	The Applicant will comply with Article 4.1 for all discharges to the combined sewer system and will obtain a Class I discharge permit from the City's to discharge industrial wastewater to the combined sewer system. The Applicant will comply with all permit conditions, including the following: discharge limitations, pretreatment requirements, peak flow restrictions, dewatering discharges, payment of fees, and monitoring and reporting requirements.
San Francisco Department of Public Works Order No. 158170	Specifies industrial waste discharge limits on wastewater discharges into the City's sewer system.	Compliance with the Class I discharge permit from the City's pursuant to Article 4.1 of the Public Works Code.
Reclaimed Water Use Ordinance Article 22 to Part II, Chapter X of the San Francisco Public Works Code	Requires installation of dual plumbing and use of recycled water, when it is available, for projects over 40,000 square feet and within the reclaimed water area.	SFERP is within the designated reclaimed water area and would involve over 40,000 square feet of new construction. The proposed SFERP includes dual plumbing and will use recycled water for process and cooling water, and is therefore in conformance with the Ordinance.
Port of San Francisco Storm Water Management Plan (December 2003)	Requires development and implementation of a Construction Storm Water Pollution Prevention Plan for construction project sites greater than one acre. Requires new development to include post-construction storm controls to capture and treat or reuse stormwater to specific design criteria and include other post-construction measures (structural and operational) to minimize potential impact to stormwater runoff.	SFERP is within the area governed by the Port SWMP and would involve over one acre of new construction. The proposed SFERP design will discharge stormwater runoff to the combined sanitary sewer system and is therefore in conformance with the Port SWMP.

8.14.3.1 Federal Clean Water Act

The federal Clean Water Act and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was established "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA established the National Pollutant Discharge Elimination System (NPDES) program to protect water quality of receiving waters. Under the Clean Water Act, Section 402, discharge of pollutants to receiving waters is prohibited unless the discharge is in compliance with an NPDES permit. In California, the USEPA has determined that the California State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards have sufficient authority under state law to administer and enforce the federal NPDES permitting program. Surface and ground water in the project vicinity are under the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Discharges of wastewater and stormwater from SFERP would flow to the City's Southeast

Water Pollution Control Plant (SEWPCP), which operates under an NPDES permit issued by the SFBRWQCB.

In addition, Section 307 of the Clean Water Act requires pretreatment of industrial discharges into publicly-owned treatment works. Industrial discharges from the SFERP would be subject to these requirements, as implemented and enforced by the City under San Francisco Public Works Code, Article 4.1. Because the industrial pretreatment standards would be enforced by the City, they are discussed below under local regulations.

8.14.3.2 State

8.14.3.2.1 Porter-Cologne Water Quality Control Act and the Basin Plan. The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) governs the regulation of water quality within California and establishes the authority of the SWRCB and the nine Regional Boards. The SFBRWQCB established regulatory standards and objectives for water quality in the Bay in the *Water Quality Control Plan for the San Francisco Bay Basin*, commonly referred to as the "Basin Plan" (SFBRWQCB, 1995). The Basin Plan identifies existing and potential beneficial uses and provides numerical and narrative water quality objectives designed to protect those uses. The SFBRWQCB considers the beneficial uses of receiving water in establishing NPDES permit requirements in the San Francisco Bay region, including the permit covering the Southeast Water Pollution Control Plant.

The following existing beneficial uses are identified for San Francisco Bay, Central and Lower portions: ocean, commercial, and sport fishing; estuarine habitat; industrial service supply; fish migration; navigation; preservation of rare and endangered species; water-contact recreation; non-contact water recreation; shellfish harvesting; and wildlife habitat. Central San Francisco Bay also is identified as having industrial process supply and fish spawning as existing beneficial uses. No "potential" beneficial uses are identified for these waters (SFBRWQCB, 1995).

8.14.3.2.2 Clean Water Act, Section 303d, Impaired Water Bodies. In accordance with Section 303(d) of the Clean Water Act, each state must present the USEPA with a list of impaired water bodies. The SWRCB has listed San Francisco Bay, Central Bay portion, as an *impaired water body* for certain specified contaminants. Impaired waters are defined as those that do not meet water quality standards, even after point sources of pollution have implemented pollution control technology. The law requires the development of action plans, known as Total Maximum Daily Loads (TMDLs), to improve water quality of impaired water bodies. The TMDL is a calculation of the total amount of a pollutant that a water body can receive and still meet water quality objectives for a pollutant identified as causing impairment. The TMDL report allocates permissible quantities for discharge from specific sources. The pollutants that have been identified as causing impairment in San Francisco Bay, Central Bay portion, include chlordane, DDT, diazinon, dieldrin, dioxin compounds, furan compounds, mercury, polynuclear aromatic hydrocarbons, exotic species, polychlorinated biphenyls, and selenium (SFBRWQCB, 2003). The SFBRWQCB is developing reports for these pollutants, and subsequent amendments will be made to the Basin Plan to adopt the TMDL and all its related parts. Wastewater discharges from the SFERP would not result in the addition of any of these identified pollutants to the combined sewer system.

8.14.3.2.3 Industrial Stormwater NPDES Permit. The SWRCB implements regulations under the federal Clean Water Act requiring that point source discharges (a point source discharge of stormwater is a flow of rainfall runoff in some kind of discrete conveyance such as a pipe, ditch, channel, or swale) of stormwater associated with industrial activity that discharge either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities, such as the proposed project, and excluding construction activities. After the completion of construction, the proposed site would be graded to direct stormwater runoff directly to the City combined sewer system. Therefore, this permit would not apply to the project.

Stormwater discharges from the SFERP site to the City combined sewer system would be subject to the requirements of the City and must be in compliance with the nine minimum controls described in the Federal Combined Sewer Overflow Control Policy (CSO Policy) and specified in the City's NPDES permit. The minimum controls include development and implementation of a pollution prevention program that would be applicable to the SFERP. The City's pollution prevention program includes best management practices to minimize the amount of pollutants carried by stormwater into the combined sewer system.

8.14.3.2.4 Construction Stormwater NPDES Permit. The federal Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (General Construction Permit; SWRCB, 1999a) that applies to projects resulting in one or more acres of soil disturbance. The proposed project would result in disturbance of more than one acre of soil. Therefore, the project will require the preparation of a stormwater management plan that would specify site management activities to be implemented during site development, including a Risk Management and Safety Management Plans (RMP/SMP). These management activities will include construction stormwater best management practices (BMPs), dewatering runoff controls, and construction equipment decontamination. Stormwater pollution prevention measures during construction will include but not be limited to those established by the *Stormwater Best Management Practice Handbook for Construction* (CASQA, 2003). Dewatering controls will include but may not be limited to containing dewatered water in a baker tank and installing erosion control measures to contain sediment from accidental spills or releases of dewatered water. Construction equipment will be cleaned by dry or wet methods as needed to prevent tracking soils offsite.

The stormwater management plan must be reviewed and approved by the City and the Port of San Francisco (Port) prior to implementation, and the City will conduct periodic inspections to ensure compliance with the erosion and sediment control plan (Lee, 2004).

8.14.3.2.5 California Environmental Quality Act. The California Environmental Quality Act (CEQA) requires that projects carried out or approved by California public agencies be evaluated for their potential to cause adverse environmental impacts, and that impacts be mitigated to the extent feasible. The CEQA evaluation of impacts must cover all aspects of the environment, including water resources, hydrology and water quality. CEQA assessment of water resource impacts includes analysis of water quality standards or waste discharge requirements, depletion of groundwater supplies or recharge; alteration of

drainage patterns; increase in runoff; degradation of water quality of surface or ground waters; and flooding hazard. The California Energy Commission's (CEC's) Final Staff Assessments is the CEQA-equivalent document under the Warren-Alquist Act.

8.14.3.2.6 California Water Code Sections 13550, 13551, 461, and SWRCB Resolution No. 75-58. These water code sections and policy statements encourage the conservation of water resources and the maximum reuse of wastewater, particularly in areas where water is in short supply. California Water Code 13550, et seq., provides that use of potable water for specified uses is a prohibited waste of water resources when recycled water is available. The SFERP proposes to use recycled water for process and cooling water, as well as for dual plumbing, and therefore is in conformance with these code sections. State Water Resources Control Board Resolution 75-58 sets forth the state's water quality control policy on the use and disposal of inland waters used for power plant cooling; this resolution applies only to uses of inland surface waters for cooling water. The SFERP proposes to use recycled water, not inland surface waters. Therefore, this resolution does not apply to the SFERP.

8.14.3.2.7 Title 22 of the California Code of Regulations. Title 22 addresses the treatment and use of recycled water; in particular Section 60306 sets forth the criteria for the use of recycled water for cooling. Such cooling water is defined as disinfected tertiary recycled water in Section 60401.230. The recycled water produced for this project would meet all Title 22 requirements. Therefore, the SFERP would be in conformance with this regulation.

8.14.3.3 Local Policies—City and County of San Francisco

8.14.3.3.1 Article 4.1 of the San Francisco Public Works Code and San Francisco Department of Public Works Order No. 158170. The Clean Water Act requires that publicly-owned treatment works regulate the discharge of industrial wastes into a sewer system subject to an NPDES permit. Accordingly, the City has adopted detailed permit requirements for industrial dischargers. The discharge of any wastewater to the City's combined sewer system would be subject to the requirements of Article 4.1 of the San Francisco Public Works Code, which regulates the quantity and quality of discharges to the combined sewer system. Order No. 158170 of the San Francisco Public Works Department provides additional industrial waste discharge limits to augment those listed in Article 4.1 of the San Francisco Public Works Code. In accordance with these regulations, the discharge would be required to meet the numeric limitations specified in Table 8.14-2.

TABLE 8.14-2
Limitations for Industrial Discharges to San Francisco Combined Sewer System

Parameter	Unit	Discharge Limit
pH[a,b]	standard units	6.0 to 9.5
Dissolved sulfides[a,b]	milligram per liter	0.5
Temperature[a,b]	degrees Fahrenheit	125
Hydrocarbon oil and grease[a,b]	milligram per liter	100
Total recoverable oil and grease[a,c]	milligram per liter	300
Arsenic, as total[d,e]	milligram per liter	4.0
Cadmium, as total[d,e]	milligram per liter	0.5
Chromium, as total[d,e]	milligram per liter	5.0

TABLE 8.14-2
Limitations for Industrial Discharges to San Francisco Combined Sewer System

Parameter	Unit	Discharge Limit
Copper, as total[d,e]	milligram per liter	4.0
Lead, as total[d,e]	milligram per liter	1.5
Mercury, as total[d,e]	milligram per liter	0.05
Nickel, as total[d,e]	milligram per liter	2.0
Silver, as total[d,e]	milligram per liter	0.6
Zinc, as total[d,e]	milligram per liter	7.0
Phenols[d,e]	milligram per liter	23.0
Cyanide, as total[d,e]	milligram per liter	1.0

Notes:
[a] Article 4.1 of the San Francisco Public Works Code, Section 123.
[b] Limitation based on any grab sample. Wastewater shall not at any time exceed the specified numerical limitation.
[c] The limitation for total recoverable oil and grease is based on a composite sample of wastewater discharge generated over a production week.
[d] City and County of San Francisco, Department of Public Works Order No. 158170.
[e] Limit based on any 24-hour representative, composite sample.

In addition to the numeric requirements of Table 8.14-2, Article 4.1 also prohibits the discharge of other materials that could obstruct or damage the sewer system; cause a nuisance; interfere with the operation, maintenance, or repair of the sewer system; or directly or indirectly cause a violation of the City's NPDES permit.

In accordance with Article 4.1, the SFERP would be required to obtain a Class I discharge permit from the City. The Class I permit would specify the detailed project-specific requirements applicable to the SFERP, including pretreatment standards, flow restrictions (e.g., peak discharges, timing of discharges), and sampling, monitoring, and reporting requirements. The Class I permit may also require the control of stormwater runoff that enters the combined sewer system. The permit would be issued for a fixed time period, not to exceed 5 years. Reports, including a description of any violations, remedial measures taken, or any process changes, are required to be submitted to the City on a quarterly basis.

Pretreatment standards tier from federal (Clean Water Act) requirements, contained in 40 CFR Part 423 (Steam Electric Power Generating Point Source Category). The specific section applicable to new sources is Section 423.15. New source performance standards for industrial pretreatment include limitations on pH, prohibition of discharges containing polychlorinated biphenyl compounds, and numeric limits for low-volume waste and chemical metal cleaning waste. The regulations also include limitations for priority pollutants that are added to the process for cooling tower maintenance. No products containing priority pollutants are proposed to be incorporated into the process for cooling tower maintenance.

Numeric pretreatment limits are established for low-volume waste and chemical metal cleaning waste. Low volume waste, if from one source, is wastewater from all sources except those for which specific limitations are otherwise established. Low volume wastes include, but are not limited to, wastewaters from wet scrubber air pollution control systems, ion exchange water treatment systems, water treatment evaporator blowdown, laboratory

and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating house service water systems. Sanitary and air conditioning wastewaters are not included. The effluent limitations specified in Table 8.14-3 are applicable to discharge of low volume waste from the SFERP.

"Chemical metal cleaning waste" means any wastewater resulting from cleaning any metal process equipment (with or without chemical cleaning compounds). The effluent limitations specified in Table 8.14-4 are applicable to discharges of chemical metal cleaning wastes.

TABLE 8.14-3
Effluent Limitations Applicable to Discharges of Low Volume Waste

Pollutant	Daily Maximum (mg/L)	Maximum 30-day Average (mg/L)
Total Suspended Solids (TSS)	100.0	30.0
Oil and Grease	20.0	15.0

TABLE 8.14-4
Effluent Limitations Applicable to Discharges of Chemical Metal Cleaning Wastes

Pollutant	Daily Maximum (mg/L)	Maximum 30-day Average (mg/L)
Total Suspended Solids (TSS)	100.0	30.0
Oil and Grease	20.0	15.0
Copper, total	1.0	1.0
Iron, total	1.0	1.0

Article 4.1 also requires a permit from the City for discharge of groundwater or water from dewatering facilities into the combined sewer system. This permit would be applicable to the SFERP if dewatering is required during construction. The permit for groundwater discharge would contain appropriate discharge standards and may require installation of meters to measure the volume of the discharge.

8.14.3.3.2 Reclaimed Water Use Ordinance. The City has adopted the Reclaimed Water Use Ordinance (Ordinances 390-91 and 391-91, approved November 7, 1991), which added Article 22 to Part II, Chapter X of the San Francisco Municipal Code (Public Works Code). If a non-residential project is within a reclaimed water area, is over 40,000 square feet, and requires a site permit, building permit, or other authorization, the ordinance mandates the installation of dual plumbing and the use of recycled water, when it is available. Dual plumbing is to be designed to service uses that could employ recycled water (e.g., toilets). The ordinance also requires that owners, operators, or managers of all such development projects register their project with the San Francisco Water Department. The Water Department will then issue a certificate of intention to use reclaimed water, and reclaimed water shall be used unless the Water Department issues a certificate exempting compliance because (1) reclaimed water is not available, (2) an alternative water supply is to be used, or

(3) the sponsor has shown that the use of reclaimed water is not appropriate. The appropriate use of reclaimed water would reduce the project's potable water consumption.

The proposed project is located within a designated reclaimed water area and would involve development of approximately 4.0 acres (174,240 square feet), exceeding the 40,000-square-foot threshold. Therefore, the SFERP would be subject to this ordinance and dual plumbing will be included in the plant design. Conformance will be achieved through use of recycled water, to be available to the SFERP upon startup of operations.

8.14.3.3.3 San Francisco General Plan Policies. Two elements of the San Francisco General Plan–the Environmental Protection and the Community Safety Elements—include policies related to water resources relevant to the SFERP. The Environmental Protection Element (1995) addresses the impact of urbanization on the natural environment, and the Community Safety Element (1997) aims to reduce future loss of life, injuries, property loss, environmental damage, and social and economic disruption from natural disasters. In addition, the project site is located within the Central Waterfront Specific Area, which has specific policies based on the geographic location within the City. Table 8.14-5 summarizes the applicable water resource goals and policies from the San Francisco General Plan and the project's conformance with those goals and policies.

TABLE 8.14-5
San Francisco General Plan Water Resources Policies Applicable to the SFERP

Element	Goal/Policy	Conformance
Environmental Protection	Policy 3.1: Cooperate with and otherwise support regulatory programs of existing regional, State, and Federal agencies dealing with the Bay, Ocean, and Shorelines.	Obtaining a City Class I permit and conforming to requirements of Article 4.1 of the San Francisco Public Works Code and San Francisco Department of Public Works Order No. 158170 would protect water quality of the Bay.
	Policy 3.3: Implement plans to improve sewage treatment and halt pollution of the Bay and Ocean.	Same as above.
	Policy 5.2: Exercise controls over development to correspond to the capabilities of the water supply and distribution system.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would minimize additional demands on the water supply and distribution system.
	Objective 6: Conserve and protect the fresh water resource.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would conserve potable water for domestic uses.
	Policy 6.2: Encourage and promote research on the necessity and feasibility of water reclamation.	Use of recycled water for industrial process and cooling water as well as for dual plumbing would demonstrate to other industries the feasibility of water reclamation and encourage other industries to consider its use.
Community Safety Element	Policy 2.9: Consider information about geologic hazards whenever City decisions that will influence land use, building density, building configurations or infrastructure are made.	Information regarding potential for flooding or inundation from tsunami at the project site for the SFERP is considered in this AFC.

TABLE 8.14-5
San Francisco General Plan Water Resources Policies Applicable to the SFERP

Element	Goal/Policy	Conformance
Central Waterfront Specific Area Plan	Objective 9: Provide public access and recreational opportunities along the shoreline; and Policy 9.1: Maintain and improve the quality of existing shoreline recreational areas at China Basin Channel, Agua Vista Park, Warm Water Cove and Islais Creek.	The SFERP would use recycled water for industrial process and cooling water rather than Bay water, thereby precluding the need for infrastructure development along the shoreline.

Source: San Francisco Planning Department, 1996. San Francisco General Plan. Environmental Protection Element (1997), Community Safety Element (1995), and Central Waterfront Specific Area Plan (1998).

8.14.3.3.4 Municipal Stormwater NPDES Permit/Port Stormwater Management Plan. The Federal CWA amendments of 1987 regulate the management of stormwater runoff from municipalities as well as specific industrial facilities. Recent state and federal regulations promulgated to implement those amendments require that designated municipalities obtain coverage under a Statewide General Permit for Municipal Stormwater Discharge. The Port of San Francisco developed the "Port of San Francisco Storm Water Management Plan" (SWMP) (Port of San Francisco, 2003) in compliance with the Statewide General Permit. The Port SWMP addresses the six minimum control measures required under the Statewide General Permit, the following two of which apply to the proposed project:

1. Construction site stormwater runoff control. The Port SWMP requires development and implementation of a construction SWPPP for all construction sites greater than one acre. The Construction SWPPP must include but not be limited to those established by the "Stormwater Best Management Practice Handbook" (CASQA, 2003).

2. Post-construction stormwater management in new development. The Port SWMP specifies that new development projects that disturb one or more acres incorporate structural and non-structural controls to minimize water quality impacts, including design standards requiring capture and treatment of stormwater as specified by the General Permit.

As part of its planning for development and redevelopment of the Southern Waterfront Area of the Port's jurisdiction (Pier 70 – Pier 96), the Port completed a study of the potential to develop an area-wide stormwater management strategy for the southern waterfront. This "Storm Water Management Study for the Port of San Francisco Southern Waterfront" (SWSMS) (Treadwell & Rollo and Watershed Resources Collaboration Group, 2003) focused on a natural systems-based approach, including use of bioretention areas, swales, and seasonal wetlands along with more traditional stormwater management approaches such as smart site design and engineered treatment systems. The structural and non-structural stormwater management practices and approaches to site design addressed in the SWSMS are consistent with the requirements of Statewide General Permit for Municipal Storm Water, and the SWSMS is a key component of the Port's post-construction controls strategy. The Port uses the SWSMS as a reference when reviewing proposed development along the Southern Waterfront, and often conditions new development subject to applicable recommendations of the SWSMS.

8.14.4 Affected Environment—Hydrologic Setting

8.14.4.1 Water Features, Rainfall, and Drainage

The SFERP site is located on a four acre property close to Pier 80, near the shoreline and directly adjacent to San Francisco Bay. The major water feature in the project vicinity, in addition to San Francisco Bay itself, is Islais Creek Channel, a tidal inlet of the Bay located about 0.2 mile south of the project site. The channel was originally the outflow of Islais Creek. Islais Creek was filled with blasted rock during the 1940s and was one of the last creeks in the City to be filled. Urban development has resulted in culverting the creek and diverting natural creek flows and drainage to the combined sewer system. Average annual precipitation in this part of San Francisco is about 21 inches, with nearly all annual rainfall occurring from November through April. Figure 8.14-1 (figures are located at the end of this subsection) shows the water features in the project vicinity.

Nearly all freshwater flow to the Bay and stormwater runoff from the east side of San Francisco has been diverted to the City's combined sewer system. The 4.0-acre project site is currently unpaved, and all drainage from the site percolates into the ground or sheet flows off the site to the Port's storm drainage system or directly into San Francisco Bay. Upon project completion, all storm drainage would flow to the City's combined sewer system located south of the site along Cesar Chavez Street. As described earlier, the City is almost entirely served by a combined sewer system, which collects and transports both wastewater (sewage and industrial discharges) and stormwater runoff in the same set of pipes. During dry weather, wastewater flows consist mainly of municipal (also referred to as sanitary sewage) and industrial wastewater. Dry weather flows to the combined sewer system along the east side of the City are transported to the Southeast Water Pollution Control Plant (SEWPCP) on Phelps Street, about 0.5 mile southwest of the project site, for treatment and subsequent discharge to the Bay through the deep water outfall at Pier 80. During wet weather, the volume of wastewater in the City's combined sewer system greatly increases when stormwater runoff mixes with the municipal and industrial wastewater. The wet weather flows are either treated at the SEWPCP or wet weather treatment facilities, or retained in storage and transport boxes for later treatment. Treated wastewater is discharged to the Bay through various outfalls and overflow structures in compliance with an NPDES permit from the SFBRWQCB.

Because of the large variation in volume of wastewater discharged to the combined sewer system, there are variations in the treatment and disposal of the wastewater depending on the volume. During dry weather, when wastewater flow volumes are low, wastewater is treated to a secondary level at the SEWPCP and discharged to the Bay through the deep water Pier 80 Outfall (secondary treatment involves treatment of wastewater or sewage of organic matter using biological and chemical processes). This is a higher level of treatment than primary treatment, which is removal of floating and settleable solids using physical operations such as screening and sedimentation. Secondary treatment is less intensive than tertiary treatment, in which additional chemical and biological treatment is used to remove pathogens, generally for recycled [non-potable] water uses. Annual average wastewater flow during dry weather is about 68 million gallons per day (mgd). During wet weather, the SEWPCP provides secondary treatment to increased wet weather flows up to the capacity of 150 mgd, and can also treat up to an additional 100 mgd to a primary treatment standard. Wet weather discharges in the project area occur through the Pier 80 Outfall or the Quint Street Outfall (on the south bank of Islais Creek one block west of the Third Street bridge).

During periods of extreme wet weather, discharges to the Bay also occur as combined sewer overflows (CSOs) at CSO structures located all along the City's waterfront. Three CSO structures are located south of the project site at the western head end of Islais Creek, and two CSO structures are located just north of the project site at 20th and 22nd streets. The combined sewer system is designed such that discharges from the CSO structures in this part of the City occur on average about 10 times per year. Discharges through the CSO structures, consisting of about 6 percent sewage and 94 percent stormwater, undergo flow-through treatment prior to discharge to the Bay to remove settleable solids and floatable materials (approximating primary treatment).

8.14.4.2 Potable Water Source

Potable water delivered to San Francisco is from the Hetch Hetchy water supply system and provided by the San Francisco Public Utilities Commission (SFPUC). The raw water source originates outside the City, with about 85 percent originating from the Tuolumne River watershed in the Sierra Nevada and about 15 percent from local Bay area watersheds. Groundwater in the project area has not been developed for domestic uses and may not be suitable for potable purposes.

8.14.4.3 Surface Waters

There are no surface waters or wetlands within the project site boundaries, and no stream crossings would be required. San Francisco Bay, including its associated inlets, is the major water feature closest to the project area. Between Piers 72 and 80, about 1,000 feet north of the site, Warm Water Cove Park is a public open space area next to the Bay where sport fishing, water-contact recreation, and non-contact water recreation opportunities occur depending on tidal water levels. The Islais Creek Channel is used for small-vessel boating and other non-contact water recreation. At the mouth of Islais Creek on the south side, there is an existing wetland area with wildlife habitat (San Francisco Planning Department, 2001).

Historically, Islais Creek was the confluence of several small creeks (one of which is still extant in Glen Canyon) that carried runoff from the southeastern portion of San Francisco and entered the Bay just west of the western end of the existing tidal inlet. Urban development and alterations to the drainage system resulted in culverting of Islais Creek and channeling most of the stream flow from Islais Creek into the City's combined sewer system. Currently, surface inflow to Islais Creek Channel occurs during the rainy season from treated wastewater discharged from the combined sewer system through the Quint Street outfall and two CSO structures along the creek channel as well as from direct stormwater runoff from areas adjacent to the creek. The western portion of Islais Creek (west of Third Street) is listed as a Toxic Hot Spot because of impacts on aquatic life due to contaminated sediment (SWRCB, 1999b). Islais Creek is also listed as an impaired water body due to sediment contaminated with ammonia, chlordane, dieldrin, edosulfan sulfate, hydrogen sulfide, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs), with the source of impairment attributed to industrial point sources and combined sewer overflow (RWQCB, 2003). The City has not accepted the listing findings and has objected to the accuracy of the data and conclusions used by the SWRCB and RWQCB. Discussions between the City and RWQCB regarding these assessments and remedial activities are ongoing.

8.14.4.4 Groundwater

Groundwater underlying the project area is part of the Islais Creek groundwater basin. This basin covers approximately 5,600 acres that historically were part of the Islais Creek drainage area, extending roughly from Twin Peaks to the Bay. The alluvial thickness ranges from zero feet where bedrock is exposed to 200 feet near the Bay. Unconsolidated sediments are made up of a combination of Colma Formation sediments and undifferentiated alluvial deposits. Bay mud occurs in a large portion of the basin, and artificial fill has been placed over the Bay margin. In general, the water table is shallow and the groundwater flow direction is from the bedrock ridges towards the valley center and then toward the Bay (San Francisco Planning Department, 1997).

Historically, there were numerous wells developed in this basin for irrigation and domestic, uses, but currently there are no groundwater wells used for potable water in the project area. The groundwater quality in this basin is generally unknown, but in the industrial area east of Highway 101, there is a high likelihood that groundwater quality has been affected by current and former industrial land uses.

The project site is located on fill material underlain by Bay Mud. At the project site, depth to groundwater is approximately 5 to 10 feet below the ground surface (AGS, Inc., 1999).

8.14.4.5 Flooding Potential

The project site is located at an elevation of approximately 13 to 15 feet above mean sea level (North American Vertical Datum, 1988) and roughly 500 feet (average) from the shoreline. The highest tide ever recorded in the project area is approximately 9.25 feet above mean sea level, measured using the North American Vertical Datum, 1988 (AGS, Inc., 1999). Based on this, the potential for flooding at the project site is low. This is consistent with the San Francisco Community Safety Element, which indicates that there are no areas prone to surface flooding in San Francisco (San Francisco Planning Department, 1995).

Tsunamis are large waves in the ocean generated by earthquakes, coastal or submarine landslides, or volcanoes. Damaging tsunamis are not common on the California coast. Most California tsunamis are associated with distant earthquakes (most likely those in Alaska or South America), not with local earthquakes. Devastating tsunamis have not occurred in historic times in the Bay area. Because of the lack of reliable information about the kind of tsunami runups that have occurred in the prehistoric past, there is considerable uncertainty over the extent of tsunami runup that could occur. There is ongoing research into the potential tsunami run-up in California. The project site is located within the area of potential tsunami inundation identified in the San Francisco General Plan Community Safety Element. The tsunami map indicates inundation areas from a 20-foot tsunami (wave height) at the Golden Gate, the maximum probable tsunami expected to occur once every 100 years, on average (San Francisco Planning Department, 1995). Although seiches and tsunamis can occur and cause tidal surges in San Francisco Bay, the Bay greatly attenuates tsunamis that might reach the Golden Gate area and these events are extremely rare.

8.14.5 Project Water Usage and Wastewater Disposal Characteristics

8.14.5.1 Water Usage and Sources

This subsection characterizes the sources and quality of water needed for power generation and other operations at SFERP. Average and maximum daily and annual water demand are provided in Table 8.14-6.

TABLE 8.14-6
Daily and Annual Water Usage for SFERP Operations

Water Use	Water Source	Daily Use (gpm[a])		Annual Use (AFY[b])	
		Average	Maximum	Average	Maximum
Process and Cooling Water	Disinfected tertiary recycled water, supplied by the City, SFPUC	239	296	132	163
Equipment Wash Water	Disinfected tertiary recycled water, supplied by the City, SFPUC	1	2	1.6	3.2
Potable Water Service	Hetch Hetchy water supply system	1	2	1.6	3.2
Fire Protection	The City's Auxiliary Water Supply System or Hetch Hetchy water supply system	0	1,500	0	0

[a] gpm = gallons per minute
[b] AFY = acre-feet per year

8.14.5.1.1 Process and Cooling Water — Recycled Water Supply. Water for the SFERP for process and cooling water, equipment wash water, and the dual plumbing system (toilets) would be recycled water to be produced onsite at a new water treatment system included as part of the project design. Details of the SFERP water requirements, plant water cycle, and process makeup water treatment are discussed in Section 2.0, Project Description.

The City will provide untreated process water (free of floatable matter and large debris) from a water pumping station to be constructed on Marin Street near Cesar Chavez, about 0.8 mile from the site. A new pipeline will be installed along Marin, Mississippi, and Cesar Chavez streets to convey the process water to a new recycled water treatment system located on the project site (see Figure 2-1).

The onsite treatment system will be designed to produce Title 22-quality recycled water, with the onsite treatment system providing primary, secondary, and tertiary treatment plus disinfection either by an ultraviolet or chlorination system. The primary treatment will be accomplished by a traveling band screen, and the secondary treatment will be achieved in an aerobic tank to ensure proper biological activity. After the appropriate hydraulic retention time, the water will flow into the tertiary treatment system. The tertiary treatment and filtering will be achieved by incorporation of a Membrane BioReactor. The recycled water will then be disinfected and pumped to the recycled water storage tank for use within the plant for all non-potable water applications. This disinfected, tertiary treated water will meet the Title 22 criteria for recycled water.

The Title 22 recycled water will then be divided into supply for the cooling towers and supply for NO_x suppression injection and compressor evaporative cooling. Cooling water treatment may require the addition of chemicals such as a pH control agent (acid or caustic), a mineral scale dispersant (i.e., polyacrylate polymer), a corrosion inhibitor (phosphate based), and a biocide (hypochlorite or equivalent). The water to be used for NO_x suppression injection and compressor evaporative cooling will be further treated, beginning with a reverse osmosis system followed by an electrodeionization system.

8.14.5.1.2 Alternative Cooling Water Sources. The SWRCB Policy 75-58 specifies that to protect water quality and quantity, water rights applications for cooling water for power plants can only be approved if other sources of water are not feasible. This resolution applies to the use of inland surface waters for cooling purposes. Since the project proposes to use recycled water and

is not applying for new water rights, Policy 75-58 is not applicable to this project. However, the SFERP use of recycled water is in conformance with the intent of the resolution. For purposes of completeness of the analysis, the following is a discussion of the alternative sources of cooling water listed in Policy 75-58 (in order of preference) to demonstrate the infeasibility of other sources.

1. **Wastewater being discharged to the ocean**. The SFERP proposes to use recycled water that would divert raw wastewater that would otherwise be treated at the Southeast Water Pollution Control Plant and then discharged to San Francisco Bay, an estuarine water body. While an alternative source of recycled water could be the Oceanside Water Pollution Control Plant, which discharges treated wastewater to the ocean, use of this source would require over 7 miles of pipeline to the SFERP site. Therefore, this is not a practical alternative due to the availability of a closer wastewater source.

2. **Ocean**. The SFERP site is adjacent to San Francisco Bay and about 7 miles from the Pacific Ocean; therefore, use of ocean water is not practical due to the availability of a closer water source of equivalent quality to ocean water. Use of Bay water is discussed below.

3. **Brackish water from natural sources or irrigation return flow**. There are no sources of agricultural irrigation return flow in the vicinity of the project site. Bay water is a potential brackish water source that could be used for cooling water, but its use would result in potential impacts to the aquatic habitat due to thermal effects of discharges to the Bay and construction of shoreline infrastructure. Use of Bay water would require an individual NPDES permit as well as permit approval from the Bay Conservation and Development Commission. Although technically feasible, this alternative was eliminated from consideration due to the availability of recycled water, which would have fewer potential impacts and fewer permitting requirements.

4. **Inland wastewater of low total dissolved solids (TDS)**. Regionally available sources of inland wastewater discharge to the San Francisco Bay; therefore, this alternative source is equivalent to the alternative source 3 above, use of Bay water.

5. **Other inland waters**. No other inland water sources, including groundwater, are available in sufficient quantity on a reliable basis.

8.14.5.1.3 Potable Water Supply. The project proposes to use potable water from the SFPUC's Hetch Hetchy Water Supply system for all potable plant service water, and fire protection needs and emergency backup cooling and process water supplies. The City's Auxiliary Water Supply System is also available for fire protection needs only. Projected demand for potable water uses at the SFERP is approximately 1,440 gallons per day, which is a negligible percentage of the current water demand in San Francisco of about 90 million gallons per day. Current and projected water supply from the Hetch Hetchy Water Supply System is adequate to meet this *de minimus* demand increase. Current and projected water supply meets all federal and state drinking water standards.

The SFERP will be supplied with potable water via a potable water pipeline located in 25th Street. A short (approximately 300-foot) supply pipeline will be connected to the SFERP. SFERP will use potable water for domestic uses, and as an emergency cooling and process backup water supply for the project.

8.14.5.2 Wastewater Discharges and Disposal

This subsection characterizes the volume and quality of wastewater that would be generated by the SFERP and method of disposal. Estimated average and maximum daily and annual wastewater discharge rates are provided in Table 8.14-7. In addition, this subsection also discusses runoff from storm events and runoff resulting from construction activities.

TABLE 8.14-7
Operational Wastewater Discharges from SFERP

Waste Discharge Stream	Discharge Location	Daily Discharge (gpm[a])		Annual Discharge (MGY[b])	
		Average	Maximum	Average	Maximum
Plant wastewater sump (discharge from process and cooling water, backwash water from ultra filters, and reject from reverse osmosis unit)	City combined sewer system	164	179	39.4	43.0
Wash water and plant drainage (e.g., equipment wash water, oil/water separator system, transfer pump water)	City combined sewer system	1	2	0.18	0.36
Sanitary sewage	City combined sewer system	1	2	0.18	0.36

[a] gpm = gallons per minute
[b] MGY = million gallons per year based on 4,000 hours of maximum annual output.

8.14.5.2.1 Industrial Wastewater Discharges. As discussed in Section 2.0, cooling tower blowdown will be discharged to the plant wastewater sump, as required to maintain the level of dissolved solids of the cooling water within acceptable ranges. Backwash water from ultra filters, reject water from the reverse osmosis unit and wash water and plant drainage will also be discharged to the wastewater sump. This wastewater, in addition to wash water from the primary treatment process unit of the recycled water treatment plant and sanitary sewage, would then be discharged to the combined sewer system as permitted under the discharge permit to be obtained from the City under Article 4.1 of the San Francisco Public Works Code. Table 8.14-8 summarizes estimated water quality of wastewater discharges from the wastewater sump to the combined sewer system, based on approximately 5 cycles of concentration of the cooling tower blowdown. Constituents of concern were selected based on the City's Class I permit requirements, the City's NPDES requirements for the SEWPCP, the approved 303(d) list, and Title 22 requirements.

TABLE 8.14-8
Estimated Wastewater Water Quality

Constituent	Reason for Inclusion of Parameter	Wastewater (mg/L except as noted)
4,4 DDE	NPDES, 303(d)	0.006 µg/L
Arsenic	NPDES, Class I permit	4.0 µg/L
Barium	NPDES	—
Biological Oxygen Demand	NPDES	<5
Cadmium	NPDES & Title 22, Class I permit	0.6 µg/L

TABLE 8.14-8
Estimated Wastewater Water Quality

Constituent	Reason for Inclusion of Parameter	Wastewater (mg/L except as noted)
Chromium	NPDES, Class I permit	2.6 µg/L
Copper	NPDES, Class I permit	29.2 µg/L
Cyanide	Class I Permit	N/A
Dieldrin	303(d)	0.004 µg/L
Dissolved sulfides	Class I permit	N/A
Hydrocarbon oil and grease	Class I Permit	<10
Lead	NPDES, Class I permit	5.0 µg/L
Mercury	NPDES, Title 22, 303(d), Class I permit	0.04 µg/L
Nickel	NPDES, Class I permit	7.8 µg/L
Phenols	Class I permit	N/A
pH, Ph units	NPDES & Class I Permit	6.0 – 9.0
Polynuclear aromatic hydrocarbons (PAHs)	NPDES, 303(d)	0.32 µg/L
Polychlorinated biphenyls	Title 22, 303(d)	0.20 µg/L
Selenium	NPDES, Title 22, 303(d)	0.10 µg/L
Silver	NPDES, Class I permit	2.0 µg/L
Total recoverable oil and grease	NPDES, Class I permit	<10
Total Suspended Solids	NPDES	<10
Zinc	NPDES, Class I permit	124 µg/L
Temperature (degrees Fahrenheit)	Class I Permit	70° F

8.14.5.2.2 Sanitary Sewage Disposal. Sanitary wastewater generated at SFERP, estimated at 1 gpm average and 2 gpm maximum, will also be discharged to the combined sewer system. This volume would be considered a *de minimus* increase in demand on the combined sewer system, not measurable within the overall dry weather flow (average 68 mgd) and well within the treatment, conveyance, and disposal capacities of the City's system.

8.14.5.2.3 Stormwater Runoff and Drainage. The existing site is unpaved, and stormwater runoff currently either percolates to the ground or sheet flows off the site directly to San Francisco Bay under the Port's SWMP and NPDES permit. After completion of construction, the proposed SFERP would result in 100 percent impervious surfaces, and stormwater would flow to the City's combined sewer system on Illinois Street. Assuming an annual average rainfall of about 21 inches and a 4.0-acre site, the annual average estimated stormwater contribution to the City's combined sewer system is approximately 2.2 million gallons per year (MGY) using the Rational Method and a runoff coefficient of 0.95. This volume of stormwater is considered negligible. The overall average yearly stormwater runoff is about 7,000 MGY on the east side of the City, where average annual dry weather flows are about 24,800 MGY. The SFERP would not result in a change in stormwater contribution from the site to the combined sewer system as compared with the existing conditions.

Peak runoff from the SFERP site would be approximately 11 cubic feet per second (cfs). Drainage infrastructure on Illinois Street is sized to accommodate the increase in stormwater discharges from the project area.

8.14.5.2.4 Construction Wastewater. As discussed in Subsection 8.12, Hazardous Waste, construction wastewater could include stormwater runoff, groundwater from dewatering, equipment washdown water, and water from pressure testing the gas lines. During construction, development and implementation of the site-specific Construction SWPPP and compliance with the requirements of the RMP/SMP will ensure that stormwater runoff and construction wastewater do not present a risk of impact to water quality. The Port's SWPPP and RMP/SMP provisions for site management activities to be implemented during site development require sediment and erosion controls to prevent runoff of site soil, using best management practices such as those presented in the "Stormwater Management Practice Handbook for Construction (CASQA, 2003). The RMP/SMP requires control of dewatered water and other construction wastewater (e.g. wash water from equipment decontamination), potentially including but not limited to collecting all construction wastewater in a baker tanks for subsequent disposal, and placement of erosion and runoff containment to prevent accidental discharge or release of construction wastewater.

8.14.5.3 Water Balance

The average and maximum volume of water used in the SFERP plant processes are shown in Figure 8.14.2, together with projected volumes of outflow of water either discharged to the City's combined sewer system or lost by evaporation.

8.14.6 Environmental Consequences— Project Effects on Water Resources

Project effects on water resources can be evaluated relative to significance criteria derived from the CEQA Appendix G checklist. Under CEQA, the project is considered to have a potentially significant effect on water resources if it would:

- Substantially alter the existing drainage pattern of the site or area, including the alteration of the course of a stream or river, in a manner which will result in substantial erosion or siltation on- or offsite, or in flooding on- or offsite.
- Create or contribute runoff water which will exceed the capacity of existing or planned stormwater drainage systems, or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements, or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there will be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells will drop to a level which will not support existing land uses or planned uses for which permits have been granted).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that will impede or redirect flood flows.

- Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.

8.14.6.1 Effects on Drainage and Surface Waters

Implementation of the project would alter existing drainage patterns. The project site is currently undeveloped, and drainage percolates to the ground or sheet flows offsite. After the SFERP is constructed, the site would be paved and drainage would be conveyed to the City's combined sewer system. The SFERP drainage facilities would include catch basins on the west side of the site that would be connected to the stormwater system at the MUNI Metro East facility. Ultimate drainage of stormwater will be discharged to the combined sewer system, and be subsequently discharged to San Francisco Bay through an existing outfall or overflow structure pursuant to the City's NPDES permit. As discussed above, there would be no substantial change in the volume of combined flows to the City's combined sewer system.

During construction, the Applicant will be required to develop and submit for review to the Port of San Francisco and the City, Bureau of Environmental Regulation and Management, an erosion and sediment control plan to prevent the off-site migration of sediment and other pollutants and to reduce the effects of runoff from the construction site to offsite areas. The City and/or Port will conduct periodic inspections to ensure compliance with the erosion and sediment control plan. During operation of the SFERP, discharges to the combined sewer system, including stormwater runoff, will be subject to the permit requirements of the City's Class I permit for industrial waste discharge. The permit requirements will include compliance with the federal combined sewer overflow control policy minimum controls, including development and implementation of a pollution prevention program. The City's pollution prevention program would require best management practices to minimize the amount of pollutants carried by stormwater to the combined sewer system.

Therefore, the project will not result in any substantial change in surface water, erosion, or siltation on- or offsite or in flooding on- or offsite, and the project would not exceed the capacity of existing drainage systems.

8.14.6.2 Effects on Groundwater

Groundwater at the project site is currently not used for potable water, and the project will have no effect on groundwater. The minor excavation and foundation structures required for SFERP would not result in any substantial change from the existing groundwater flow and conditions at the site. During construction, temporary dewatering may be required, and any dewatering activity would require a permit from the City for discharge to the combined sewer system. However, the project will have no long-term effect on groundwater.

8.14.6.3 Effects on Recycled Water and Potable Water

The project will use recycled water produced onsite for cooling tower makeup, other process water, equipment wash water, and dual plumbing. Recycled water use will have a minimal net positive impact on water resources by reducing the amount of water discharged to San Francisco Bay and is consistent with the CEC objective for reusing water to the greatest extent practicable.

In addition, installation of dual plumbing would enable use of recycled water for toilets and other non-potable uses and would reduce the demand on the potable water supply.

8.14.6.4 Effects on Water Quality

The project would not result in a measurable effect on water quality during construction or operation. During construction, development and implementation of the site-specific Construction SWPPP and compliance with the requirements of the Port's SWMP and the RMP/SMP will ensure that stormwater runoff and construction wastewater do not present a risk of impact to water quality. During operation, wastewater and stormwater discharges would flow to the City's combined sewer system in compliance with the Article 4.1 of the San Francisco Public Works Code. Flows to the combined sewer system would then be treated and discharged to the Bay in compliance with all applicable regulatory permits, providing an approved level of water quality protection.

During operation, the wastewater streams would consist of three main sources: industrial process water, stormwater discharges, and sanitary sewage. Quality and quantity of industrial wastewater discharges to the City's combined sewer system must be in compliance with a permit from the City under Article 4.1 of the San Francisco Public Works Code. The discharge would be required to meet the discharge limitations specified in Table 8.14-2 and other numeric and narrative standards discussed in Subsection 8.14.3.3.1. As shown in Table 8.14-8, the anticipated quality of wastewater discharges from SFERP would be well within the City's discharge limitations. Discharge of stormwater from the site would flow to the combined sewer system. The volume of sanitary sewage would be about 1,440 gallons per day, which is minimal compared to the overall volume of discharges to the City's sewer system.

The source of process and cooling water would be recycled water produced onsite and originating from water that would otherwise be transported to the SEWPCP; therefore, there would be a small net decrease in volume of overall discharges to the Bay. The project in effect would divert wastewater that would otherwise be discharged to the Bay, and that wastewater would be treated to meet Title 22 standards for recycled water and any additional processes needed to meet water quality requirements for the SFERP process and cooling water. Under average water usage conditions, about 48 percent of the recycled water would be returned to the combined sewer system and nearly 52 percent of the recycled water would be lost to evaporation. The net result would be a reduction in flow to the combined sewer system and a slight reduction in the volume of outflow discharges to the Bay, even though mass loading of pollutants would be the same. This would be an incidental, albeit minor, beneficial impact to water quality.

During construction, development and implementation of the site-specific Construction SWPPP and compliance with the requirements of the Port's SWMP and the RMP/SMP will ensure that stormwater runoff and construction wastewater do not present a risk of impact to water quality. After completion of the storm drain system, any stormwater drainage during construction would flow to the City's combined sewer system, where it would receive treatment at the SEWPCP or other wet weather facilities and would be discharged through an existing outfall or overflow structure in compliance with the existing NPDES permit. Because the City's combined system provides a much higher level of stormwater treatment than the Port's dedicated storm drainage system, the collection of storm drainage

in the combined system would eliminate untreated discharge of stormwater into San Francisco Bay.

8.14.6.5 Effects on Flooding Potential

The project site is located at an elevation of approximately 13 to 15 feet above mean sea level (North American Vertical Datum) and roughly 500 feet (average) from the shoreline. The highest tide ever recorded in the project area is approximately 9.25 feet above mean sea level, measured using the North American Vertical Datum, 1988 (AGS, Inc., 1999). Therefore, the project will have no potential to affect or be affected by flooding.

Although seiches and tsunamis can occur and cause tidal surges in San Francisco Bay, the Bay greatly attenuates tsunamis that might reach the Golden Gate area and these events are extremely rare. Potential inundation from seiche, tsunami, or mudflow is considered remote.

8.14.7 Mitigation Measures

Implementation of the SFERP project as designed will have less-than-significant impacts. The following project elements will effectively reduce potential impacts to water resources:

- Use of recycled water for cooling-tower makeup, other process water, and equipment washwater would divert wastewater from the combined sewer system.
- Compliance with requirements of Article 4.1 of the San Francisco Public Works Code regarding quality and quantity of discharges to the combined sewer system would avoid potential water quality effect on the Bay.
- Compliance with the Reclaimed Water Ordinance requiring installation of dual plumbing would reduce demand on the potable water supply.
- Compliance with the City's requirements for an erosion and sediment control plan would reduce potential impacts of stormwater runoff from the construction site.

8.14.8 Proposed Monitoring Plans and Compliance Verification Procedures

Routine monitoring and reporting of wastewater discharges and compliance verification will be required as part of the City's permitting requirements under Article 4.1 of the San Francisco Public Works Code. The Applicant will also be required to prepare an erosion and sediment control plan for review and approval by the Port and/or the City and will be subject to periodic inspection by the City during construction to ensure no adverse impacts to water quality. No additional monitoring of surface or groundwater will be required because no water quality impacts are expected to occur.

8.14.9 Cumulative Impacts

Cumulative impacts to water resources could occur through the contribution of additional industrial wastewater or stormwater runoff to the combined sewer system. However, as discussed previously, none of these categories of water use is expected to result in impacts to water resources, and therefore, the project would not contribute to cumulative impacts, as summarized below:

- **Surface Water:** The project would not involve construction in or disturbance of any surface waters or wetlands. All drainage from the site will be directed to the combined sewer system.
- **Recycled Water**: The use of recycled water will have a net positive benefit for water supplies in the region, by reducing the net outflow of treated wastewater to the Bay.
- **Plant Sewage**: The proposed plant staff will generate insignificant volumes of sanitary sewage, not measurable within the total dry weather wastewater flows, and in addition, installation of dual plumbing so that recycled water would be used for toilet flushing would further reduce the net increase in sanitary sewage.
- **Groundwater**: The project would have no impact on groundwater, with the possible exception of encountering shallow groundwater during construction.
- **Stormwater**: The project would not change the volume or rate of stormwater generated from the site. As part of the project, the site would be covered by 100 percent impervious surfaces and discharge stormwater runoff to the City's combined sewer system, rather than to on-site infiltration or runoff directly to the Bay.

8.14.10 Permits Required and Agencies Consulted

A summary of required permits and agency contacts is provided in Table 8.14-9.

TABLE 8.14-9
Water Quality Permits Required for SFERP

Permit	Schedule	Agency
San Francisco Class I Industrial Discharge Permit, Construction dewatering permit	Minimum of 90 days prior to the commencement of the discharge	San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management 3801 Third Street, Suite 600 San Francisco, CA 94124 Contact: Tommy Lee, Division Engineer, Environmental Regulation and Management (415) 695-1321

8.14.11 References

AGS, Inc. 1999. *Final Geotechnical Study Report – MUNI Metro East Light Rail Vehicle Maintenance and Operation Facility.* Prepared for the City and County of San Francisco Public Transportation Department.

AGS, Inc. 2000. *Final Risk Management Plan and Site Management Plan – MUNI Metro East Light Rail Vehicle Maintenance and Operations Facility.* Prepared for San Francisco Municipal Railway, City and County of San Francisco.

California Stormwater Quality Association (CASQA). 2003. *Stormwater Best Management Practice Handbook for Construction*. January.

Lee, Tommy. 2004. Letter to Joyce Hsiao, Orion Environmental Associates from Tommy Lee, San Francisco Public Utilities Commission, Bureau of Environmental Regulation and Management, Division Engineer, dated February 4, 2004 regarding the San Francisco Electric Reliability Project, Industrial Wastewater and Stormwater Discharge Permit Requirements.

Port of San Francisco. 2003. *Port of San Francisco Storm Water Management Plan*. December.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 1995. *Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan).*

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 2002. Order No. R2-2002-0073, NPDES Permit No. CA 0037664. *Waste Discharge Requirements for City and County of San Francisco, Southeast Water Pollution Control Plant, North Point Wet Weather Facility and Bayside Wet Weather Facilities.* Adopted June 19, 2002.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). 2003. *2002 CWA Section 303(d) List of Water Quality Limited Segment.* Approved by the SWRCB on February 4, 2003.

San Francisco Planning Department. 1995. Community Safety Element.

San Francisco Planning Department. 1996. *San Francisco General Plan*. Environmental Protection Element (1997), Community Safety Element (1995), and Central Waterfront Specific Area Plan (1998).

San Francisco Planning Department. 1997. *San Francisco Recycled Water Master Plan and Groundwater Master Plan, Final Environmental Impact Report*. Planning Department Case No. 92.371E. State Clearinghouse No. 94123049. Certified August 7, 1997.

San Francisco Planning Department. 2001. *San Francisco Southern Waterfront, Supplemental Environmental Impact Report*. Planning Department Case No. 1999.377E. State Clearinghouse No. 94123007. Certified February 15, 2001.

State Water Resources Control Board (SWRCB). 1997. *State Water Resources Control Board (State Water Board), Water Quality Order No. 97-03-Dwq National Pollutant Discharge Elimination System (NPDES) General Permit No. Cas000001 (General Permit), Waste Discharge Requirements (WDRs) For Discharges Of Stormwater Associated With Industrial Activities Excluding Construction Activities.* Available at www.swrcb.ca.gov/stormwtr.

State Water Resources Control Board (SWRCB). 1999a. Water Quality Order 99-08-DWQ. National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater Discharges Associated with Construction Activity (General Permit). Available at http://www.swrcb.ca.gov/stormwtr.

State Water Resources Control Board (SWRCB). 1999b. *Consolidated Toxic Hot Spots Cleanup Plan*. April 1999. Accessed at http://www.swrcb.ca.gov/bptcp/docs/conplnv2.doc.

Treadwell & Rollo and Watershed Resources Collaboration Group. 2003. *Revised Draft Storm Water Management Study for Port of San Francisco Southern Waterfront, Pier 70 to Pier 96.* Prepared for: San Francisco Department of Public Works, Bureau of Construction Management, Site Assessment and Remediation. March.

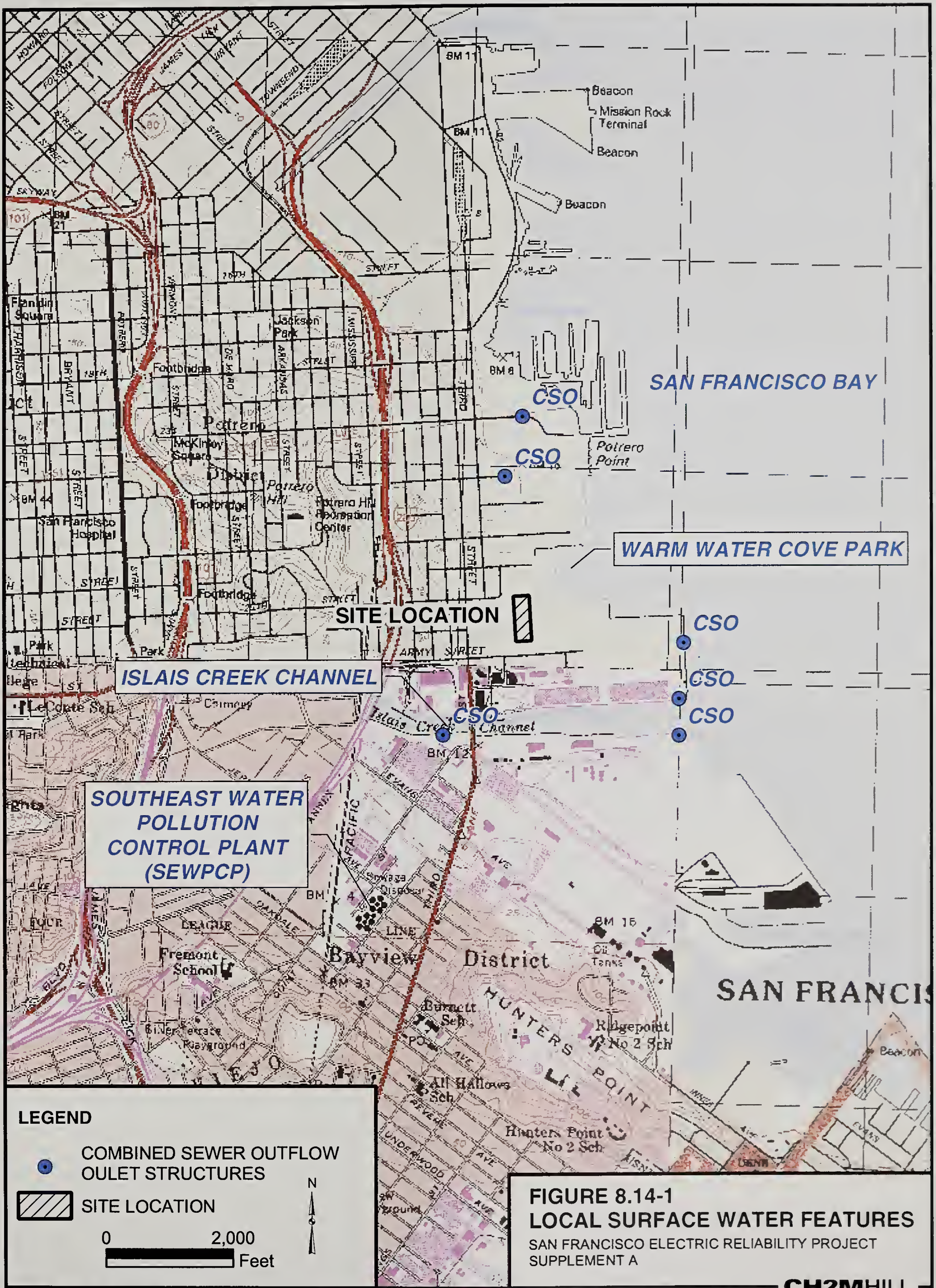
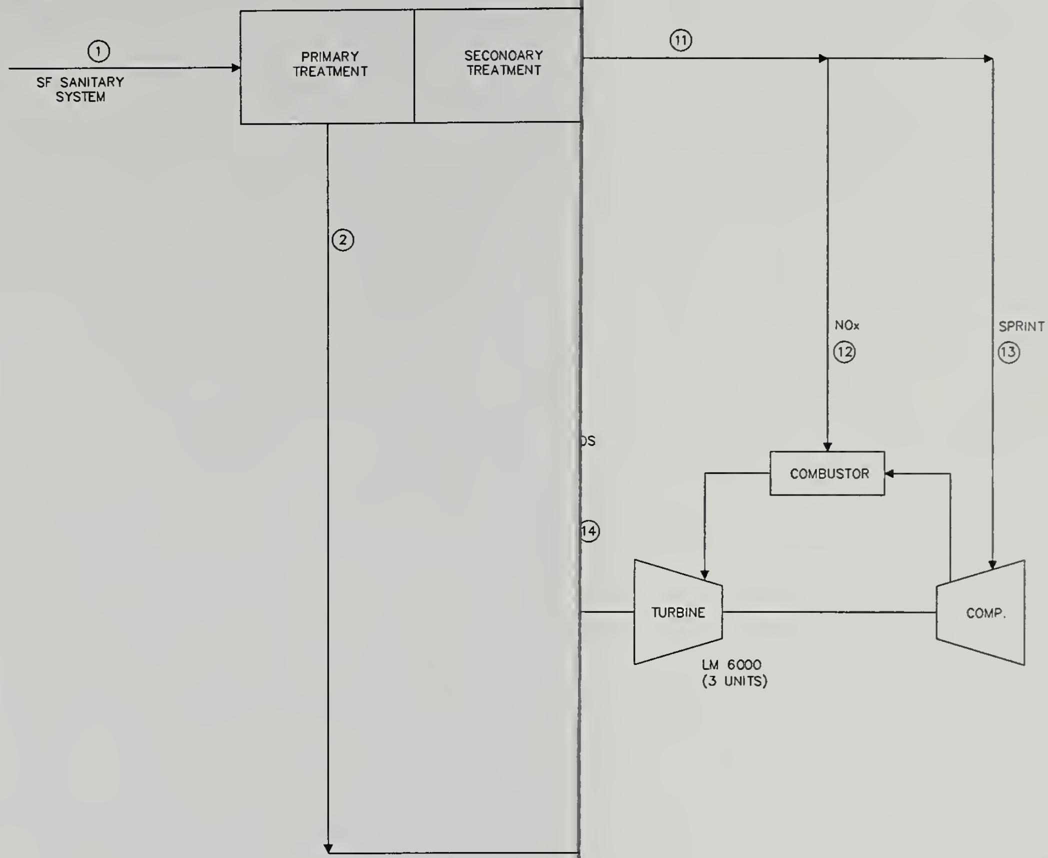


FIGURE 8.14-1
LOCAL SURFACE WATER FEATURES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL



SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D
E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		

PB Power, Inc.
A Parsons Brinckerhoff Company
303 SECOND STREET, SUITE 700 NORTH, SAN FRANCISCO, CALIFORNIA 94107

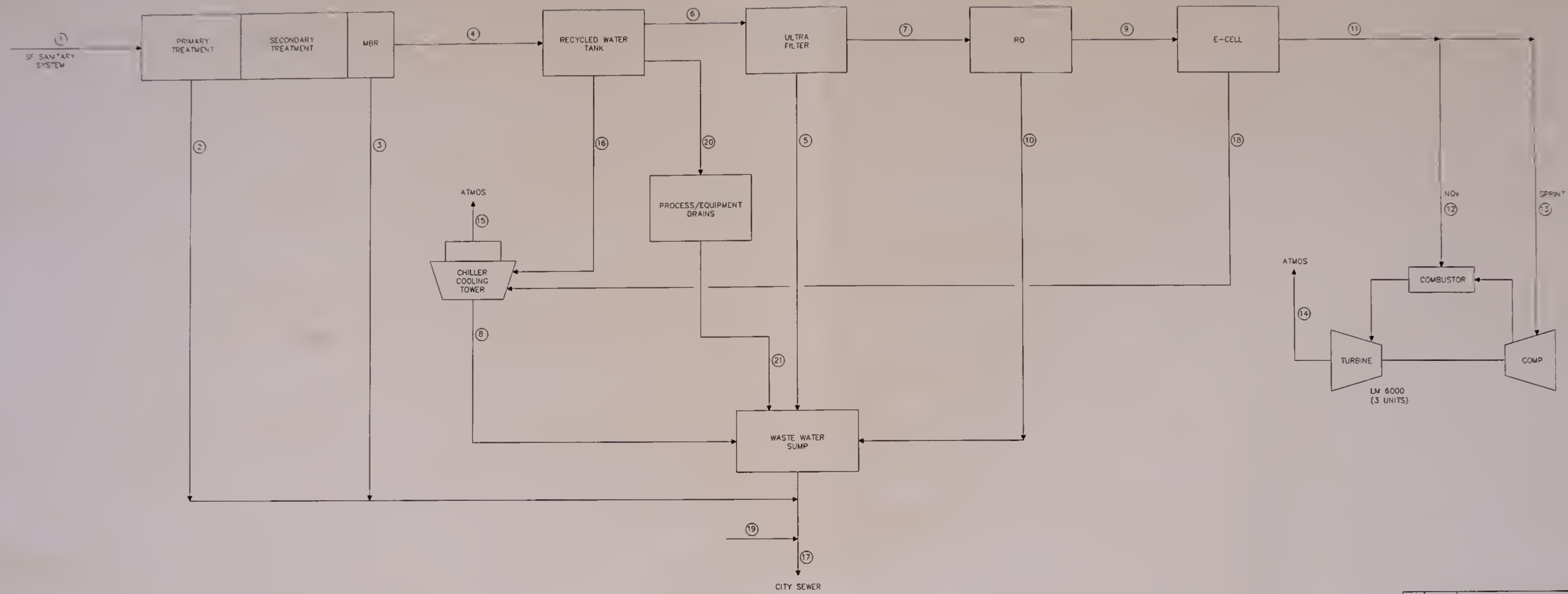
SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR. LTW
DES. CM
CHK. CM
APPROVED DATE
PRINCIPAL IN CHARGE DATE
DRAWING NO M2.2
REV E
SHEET OF

FIGURE 8.14-2
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL



SFPUC Electric Reliability Project - Water Balance					Rev E
			Average Water Use (3 CTG's in Operation)	Maximum Water Use (3 CTG's in Operation)	Notes
Point No	From	To	GPM	GPM	
1	SF sanitary system	Primary/Secondary Treatment	349	408	
2	Primary Treatment	Plant wastewater system	100	100	
3	MBR	Plant wastewater system	10	12	
4	MBR	Recycled water tank	239	296	
5	Ultra Filter Reject	Plant Waste Water Sump	15	14	
6	Reclaimed water tank	Ultra Filter Inlet	222	221	
7	Ultra Filter Product	RO Inlet	207	206	
8	Cooling Tower Blowdown	Plant Waste Water Sump	5	16	(@ 5 cycles of conc)
9	RO Product	E-Cell Inlet	175	174	
10	RO Reject	Plant Waste Water Sump	33	32	
11	E-Cell Product (DI Water)	CTG NOx & SPRINT Injection	166	165	
12	E-Cell Product (DI Water)	CTG NOx Injection	141	140	@ 25 ppm NOx
13	E-Cell Product (DI Water)	CTG SPRINT Injection	25	25	
14	DI Water Evaporation	Atmosphere	166	165	
15	Cooling Tower Evaporation	Atmosphere	19	64	
16	Recycled Water Tank	Cooling Tower Makeup	15	71	
17	Plant wastewater system	City Sanitary Sewer	166	183	
18	E-Cell Reject	Cooling Tower Makeup	9	9	
19	Domestic	Plant wastewater system	2	4	
20	Recycled water tank	Plant / equipment drains	2	4	
21	Plant / equipment drains	Plant Waste Water Sump	2	4	

Annual reclaimed water usage:	43,013,015	gallons
(based on 12,000 turbine-hours)	132	acre-feet

E	2-19-04	WATER BALANCE CHART ADJUSTED		
D	2-16-04	REVISED FOR 3 CTG'S		
C	1-27-04	REVISED PRELIMINARY ISSUE		
B	1-5-04	PRELIMINARY ISSUE FOR REVIEW		
A	11-18-03	PRELIMINARY ISSUE FOR REVIEW		
SYMBOL	DATE	REVISION DESCRIPTION	DRAWN	APP'D

PB Power, Inc.
A Parsons Brinckerhoff Company
303 SECOND STREET, SUITE 700 NORTH, SAN FRANCISCO, CALIFORNIA 94107

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
SAN FRANCISCO, CALIFORNIA

ELECTRIC RELIABILITY PROJECT
WATER BALANCE DIAGRAM

DR. LTW
DES. CM
CHK. CM
APPROVED DATE
PRINCIPAL IN CHARGE DATE
DRAWING NO. M2.2
REV E
SHEET OF

FIGURE 8.14-2
WATER BALANCE DIAGRAM
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

SUBSECTION 8.15

Geologic Hazards and Resources

8.15 Geologic Hazards and Resources

8.15.1 Introduction

This subsection evaluates the effect of geologic hazards and resources that might be encountered on the project site. The objective of this evaluation is to identify site conditions and the potential impacts from the construction or operation of the project. This section presents a summary of the relevant laws, ordinances, regulations, and standards (LORS); the existing site conditions; and the expected direct, indirect, and cumulative impacts because of construction, operation, and maintenance of the project; proposed mitigation measures and the effectiveness and monitoring plans; and required permits and permitting agencies.

8.15.2 Laws, Ordinances, Regulations, and Standards

The LORS that apply to geologic hazards and resources are summarized in Table 8.15-1.

TABLE 8.15-1
Laws, Ordinances, Regulations, and Standards

Jurisdiction	Authority	Administering Agency	Compliance
Local	Uniform Building Code (UBC), 1997, Appendix Chapter 16, Division 4	City and County of San Francisco	Acceptable design criteria for structures with respect to seismic design and load-bearing capacity
State	California Building Code (CBC), 2001	City and County of San Francisco	

8.15.3 Affected Environment

The proposed San Francisco Electric Reliability Project (SFERP) site is a 4.0-acre parcel near Potrero Point in the Potrero District of the City of San Francisco (City). The project site is located along the eastern side of the San Francisco Peninsula, near the San Francisco Bay (the Bay) and north of the Islais Creek Channel between Cesar Chavez Street and 25th Street. The San Francisco Peninsula lies within the northern Coast Ranges physiographic province. This province is characterized by a northwest-trending series of elongated ranges and narrow valleys and extends from the Oregon border to the Transverse Ranges in Southern California (Norris and Webb, 1990).

The proposed SFERP site is relatively flat (approximately 13 feet above mean sea level) and is underlain by Franciscan-age bedrock and older alluvial deposits, and locally by artificial fill. The entire site is reclaimed tidal flats (Older and Younger Bay Muds and estuary deposits). A process water supply linear that is approximately 0.76 miles long will also be installed, originating from Marin Street and Mississippi Street where a Water Pump Station will be located. An approximately 300-foot-long potable water supply line will interconnect the SFERP to the City's potable water pipeline located in Cesar Chavez Street due south of the project site. The electricity produced by the project will be transmitted to the PG&E Potrero Substation via approximately 3,000 feet of underground transmission lines.

The project area is considered to be seismically unstable and is designated as a California UBC Seismic Zone 4.

8.15.3.1 Regional Geology

The geology of the SFERP vicinity is complex, largely a result of the interaction of the strike-slip tectonics of the San Andreas fault system and the compressional tectonics of the Coast Ranges. The Coast Ranges are composed of a series of parallel, northwesterly trending folded and faulted ranges and represent structural blocks comprised of a variety of lithologic types. These structural blocks are juxtaposed by major geologic structures. The San Andreas fault zone lies to the west (approximately 7 miles) and is a major boundary that separates the Franciscan Complex rocks of the North American Plate from the Salinian basement rocks of the Pacific Plate.

8.15.3.2 Local Geology

The site is situated southeast of the Potrero Hill rock mass that is composed of serpentine bedrock of the Franciscan Formation. Quaternary to Holocene alluvial and estuarine deposits along with recent artificial fill overly the bedrock deposits. The entire site has been reclaimed through the placement of artificial fill since the mid-1800s. The geology within a 2-mile radius of the site is presented on Figure 8.15-1 (figures are located at the end of this subsection).

A geotechnical investigation was performed in 1999 by AGS, Inc. at the proposed San Francisco Municipal Railway (MUNI) Metro East Light Rail Vehicle Maintenance and Operations Facility that is located immediately west of the proposed SFERP site. Several of the eastern borings drilled as part of that assessment were located on the proposed SFERP site (AGS, Inc., 1999). Data collected from that investigation has been used to support preliminary site conditions presented herein until a site-specific geotechnical investigation for the SFERP site can be conducted.

8.15.3.3 Stratigraphy

8.15.3.3.1 Franciscan Basement. The SFERP site is located within the Hunters Point Shear Zone within the Franciscan Complex and is primarily comprised of serpentinite. Large zones of serpentinite and brecciated materials from previous periods of deformation are characteristic of the Franciscan formation.

8.15.3.3.2 Quaternary Alluvial and Fluvial Deposits. Alluvial deposits that overlay the Franciscan bedrock at the site were derived from topographic highs around the site. Lithologic types present include gravelly and clayey sands, and sandy clays. Bay Mud, associated with estuarine deposits, also overlies the bedrock. Artificial fill consists of a mixture of sand, gravel, and silt, with rubble and debris (e.g. bricks, concrete, wood, and re-worked bedrock). Artificial fill was present immediately below the ground surface in all borings (AGS, Unc., 1999).

8.15.3.3.3 Structure. The site is located within the Hunters Point Shear Zone on the northern edge of the San Francisco Peninsula. This shear zone is an older structure (Jurassic) that trends northwest across the Peninsula and has been deformed by translations and movement along the San Andreas Fault system (Dames and Moore, 2000).

The California Geological Survey (CGS) does not consider the shear zone active. A geophysical study performed by the United States Geological Survey (USGS) suggested that the shear zone was inactive during the late Pleistocene and Holocene eras (Dames and Moore, 2000).

The San Andreas Fault system is the most notable geologic structure in the site area. The fault system includes primary, secondary, and thrust faults that trend northwest in the regional area and are capable of producing large magnitude earthquakes.

8.15.3.4 Seismicity

The project site lies within the San Andreas Fault system region that separates the North American and Pacific plate boundaries. This boundary has been the site of numerous large-scale earthquakes. The area is considered seismically active. However, the site is not located within a special study zone, as delineated by the Alquist-Priolo Special Studies Zone Act of 1972; and no known fault, active or inactive, reaches the surface within the project area (Jennings, 1994). The significant faults in the San Francisco Bay area are described below and are shown on Figure 8.15-2.

8.15.3.4.1 San Andreas Fault. The nearest major fault is the San Andreas fault, which is approximately 7 miles west of the site. This fault is the largest active fault in California and extends from the Gulf of California to Cape Mendocino in northern California. The San Francisco moment magnitude (Mw) 7.9 earthquake of 1906 was attributed to this fault. The fault was previously divided into 3 segments, however the recommendation of the Working Group on Northern California Earthquake Potential (WGNCEP, 1996) was to subdivide the fault into 4 segments (the section of the fault north of Point Arena is now referred to as the Offshore segment). The primary three segments are located in the San Francisco Bay Area (North Coast, Peninsular, and Southern Santa Cruz Mountains) and have recently been assigned individual maximum credible earthquakes (MCEs) of Mw 7.5, Mw 7.2 and Mw 7.0, respectively, by the Working Group on Northern California Earthquake Potential (WGNCEP, 2003). The same working group identified the MCE for all 4 segments combined, as is thought to be the cause of the 1906 earthquake, to be Mw 7.9. According to the WGNCEP (2003), there is a 21 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.2 San Gregorio Fault. West of the San Andreas fault is the San Gregorio fault. This fault is approximately 11 miles from the project site and is considered to be an active Holocene fault. It is approximately 80 miles long and runs from Big Sur to the Golden Gate Bridge. Most of the fault is offshore, but several areas are onshore. The MCE from this fault is Mw 7.3 (WGNCEP, 2003). According to the WGNCEP (2003), there is a 10 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.3 Hayward and Rodgers Creek Fault. The Hayward and Rodgers Creek Fault System lies approximately 11 miles east of the site, across San Francisco Bay. The fault system is considered to include the northern and southern Hayward Fault system as well as the Rodgers Creek fault, and extends from Healdsburg south to Fremont (WGNCEP, 2003). It is approximately 87 miles long and is considered by the WGNCEP to be the most likely source of the next major earthquake of the Bay Area (WGNCEP, 1996). The 1868 local magnitude 6.8 Mw earthquake was the last major earthquake on the Hayward fault. A MCE Mw of 6.9

has been assigned to the simultaneous rupture of the northern and southern segments of the Hayward fault (WGNCEP, 2003). A simultaneous rupture of the three segments that make up this fault system has been assigned a MCE of Mw 7.3. According to the WGNCEP (2003), the Hayward and Rodgers Creek fault system has a 27 percent probability of generating a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.4 Calaveras Fault. The Calaveras fault lies approximately 22 miles east of the site. It is approximately 76 miles long and contains three identified segments that extend from Hollister to Danville. MCEs assigned for the three segments range from Mw 5.8 and Mw 6.2 for the southern and central segments, respectively, to Mw 6.8 for the northern segment (WGNCEP, 2003). Combined, the fault is assigned an MCE of Mw 6.9. According to the WGNCEP (2003), there is an 11 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.5 Concord-Green Valley Fault Zone. The Concord-Green Valley fault is located approximately 25 miles to the northeast of the site. It is a 35-mile long right-lateral strike-slip fault that extends from Walnut Creek north across Suisun Bay to Wooden Valley WGNCEP (2003). The MCE previously assigned to the assumed 2 segments of this fault system was Mw 6.9 (WGNCEP, 1999). According to the WGNCEP (2003) the fault system actually comprises 3 individual segments with a combined MCE of Mw 6.7. According to the WGNCEP (2003), there is a 4 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.4.6 Greenville-Marsh Creek Fault. The Greenville-Marsh Creek fault is located approximately 29 miles east of the site. The fault is a northwest-striking strike-slip fault approximately 35 miles long in the northern Diablo Range. The MCE assigned for this two-segment fault is Mw 6.9 (WGNCEP, 2003). According to the WGNCEP (2003), there is a 3 percent probability of a Mw 6.7-equal or greater earthquake within 30 years along this fault.

8.15.3.5 Geologic Hazards

A site-specific geotechnical investigation will be conducted to support design engineering for the project. Results of the investigation will be provided upon request.

The following subsections discuss the potential geologic hazards that might occur in the project area.

8.15.3.5.1 Ground Rupture. Ground rupture is caused when an earthquake event along a fault creates rupture at the surface. Since no known faults exist at the project site, the likelihood of ground rupture to occur at the project site is low.

8.15.3.5.2 Seismic Shaking. The San Francisco Bay Area has experienced strong ground motion in the past and will do so in the future. Analysis by the computer program EQFault (Blake, 2000), a deterministic estimation of peak acceleration from digitized faults based on the 1996 fault maps, indicates that peak horizontal geologic hazard at the SFERP site is strong ground-shaking due to an earthquake. Mualchin (1996) estimated that the ground-shaking of a Mw 8.0 earthquake along the San Andreas fault system could produce peak ground gravity (g) acceleration of up to 0.4 g in the vicinity of the SFERP. For the MUNI site immediately to the west, AGS reported that a peak horizontal ground surface acceleration of

0.55 g could be possible for the site – based on causative fault and mean values of the peak bedrock accelerations and the effect of local soil conditions (AGS, Inc., 1999). A copy of the Final Geotechnical Study Report for the MUNI Metro East Light Rail Vehicle Maintenance and Operation Facility is contained in Appendix 8.15. The USGS seismic hazard mapping web site (USGS, 2002) indicates that the peak horizontal ground acceleration could be as high as 0.53 g based on the 1996 seismic hazard map using a latitude/longitude site-specific search (USGS, 2002).

8.15.3.5.3 Liquefaction. During strong ground-shaking, loose, saturated, cohesionless soils can experience a temporary loss of shear strength. This phenomenon is known as liquefaction. Liquefaction is dependent on grain size distribution, relative density of the soils, degree of saturation, and intensity and duration of the earthquake. The potential hazard associated with liquefaction is seismically induced settlement. The depth to groundwater at the project site is relatively shallow, approximately 5 to 7 feet, and the soil types generally consist of loose to medium dense sandy and gravelly fill soils of unknown origin up to approximately 20 feet thick (AGS, Inc., 1999). Therefore, the likelihood that liquefaction will occur is considered potentially high.

8.15.3.5.4 Mass Wasting. Mass wasting depends on steepness of the slope, underlying geology, surface soil strength, and moisture in the soil. Significant excavating, grading, or fill work during construction might introduce mass wasting hazards at the SFERP site. Because the SFERP site is relatively flat and no significant excavation is planned during site construction, the potential for direct impact from mass wasting at the site is considered low to negligible.

8.15.3.5.5 Subsidence. Subsidence can be a natural or man-made phenomenon resulting from tectonic movement, consolidation, hydrocompaction, or rapid sedimentation. Organic soils, typical of marsh deposits, would not be expected to be present as that original shoreline is approximately 3,000 feet to the west of the site. Given that the site is underlain by fill that directly overlays bay mud and the lack of organic soils identified in borings drilled near the site, the potential for subsidence, as a hazard that could affect the project site, is low.

8.15.3.5.6 Expansive Soils. Expansive soils shrink and swell with wetting and drying. The shrink-swell capacity of expansive soils can result in differential movement beneath foundations. Site-specific borings advanced in the vicinity of the project site have identified fill and Bay Mud (AGS, Inc., 1999). In addition, the depth to water is relatively shallow and significant shrink-swelling would not be expected. Based on these, the likelihood of expansive soils to be present at the site is low.

8.15.3.5.7 Geologic Resources of Recreational, Commercial, or Scientific Value. Geologic resources of recreational, commercial, or scientific value in the project vicinity that could be affected include aggregate and gas reserves. Geologic resources of value are discussed in the next paragraph.

8.15.3.5.8 Aggregate Resources. In 1987, the California Division of Mines and Geology performed a mineral land classification of the San Francisco-Monterey Bay Area. According to the published report, the entire SFERP site was classified as Mineral-Resource Zone (MRZ)-1, defined as "areas where adequate information indicates that no significant mineral

deposits are present, or where it is judged that little likelihood exists for their presence" (Dames and Moore, 2000). Two areas nearby were classified as MRZ-2, where "significant mineral deposits are present." These are in the Bernal Heights area and near Candlestick Point. However, neither of these two locations is under development.

8.15.3.5.9 Natural Gas. No oil or gas fields are present in the project vicinity, according to online maps from the State of California Division of Oil, Gas and Geothermal Resources (CDOGGR, 2003).

There are no known geologic resources that provide a significant scientific or recreational value in the vicinity of the site.

8.15.4 Environmental Impacts

8.15.4.1 Generating Facility

8.15.4.1.1 Geologic Hazards. Ground-shaking presents the most significant geologic hazard to the proposed SFERP site and project linear. Table 8.15-2 summarizes the geologic hazards associated with the SFERP.

TABLE 8.15-2
Summary of Potential Geologic Hazards

Project Component	Area of Potential Concern	Geologic Hazards of Potential Concern
Proposed generating facility site (up to 4.0 acres)	Entire site	Seismic ground-shaking, liquefaction
Project linears	Entire site	Seismic ground-shaking, liquefaction

8.15.4.1.2 Geologic Conditions and Topography. Construction will require minor grading and excavation, thereby altering the terrain of the SFERP site. Impacts on the geologic conditions involve changes in drainage, cuts, and fills. Since the site is generally level, site grading is not expected to adversely impact the geologic environment.

8.15.4.2 Geologic Resources of Recreational, Commercial, and Scientific Value

No known natural resources occur in the SFERP site area. The two MRZ-2 areas identified near Bernal Heights and Candlestick Point are not being actively developed. No significant impact to geologic resources would occur with the project.

8.15.5 Mitigation Measures

The following subsections describe mitigation measures that could be used to reduce impacts from geologic hazards.

8.15.5.1 Ground Rupture

No active faults cross the SFERP site or project linear (Jennings, 1994). Therefore, no mitigation measures are required to reduce the hazard from surface faulting rupture.

8.15.5.2 Ground-Shaking

The SFERP site and project linear will need to be designed and constructed to withstand strong earthquake-shaking as specified in the 2001 CBC for Seismic Zone 4. A site-specific geotechnical investigation (forthcoming) will aid in the development of the seismic design criteria.

8.15.5.3 Liquefaction

The soil types present at the SFERP site and along the project linear may be conducive to liquefaction. A site-specific geotechnical investigation currently being planned will aid in the assessment of liquefaction potential and lateral spreading. Pile and foundation design will consider the results of the assessment as described in Appendix 10G.

8.15.5.4 Subsidence

Based on site-specific data, subsidence is not considered to be a hazard at the site and mitigation would not be required.

8.15.5.5 Expansive Soils

Expansive soils can be mitigated by removing the soil and backfilling with non-expansive soil, instituting chemical stabilization of the soil, or constructing a foundation treatment that resists uplift of the expansive soil. Previous borings drilled at the site have not identified soils that would be prone to expansion. As a result, mitigation measures would not be required at the site.

8.15.6 Involved Agencies and Agency Contacts

No permits are required for compliance with geological LORS. However, the City and County of San Francisco Building Department is responsible for enforcing compliance with building standards.

8.15.7 Permits Required and Permit Schedule

Compliance of building construction with UBC standards is covered under engineering and construction permits for the project. There are no other permit requirements that specifically address geologic resources and hazards. However, excavation/grading and inspection permits will be required prior to construction and will be included in the overall project construction permit. Borings for the design engineering geotechnical investigation will require a permit from the Department of Public Health. Required permits and agency contact information is summarized in Table 8.15-3.

TABLE 8.15-3
Permits and Agency Contact Information

Agency	Contact	Telephone
City and County of San Francisco Department of Environmental Health—Monitoring Well Unit	Larry Kessler—Inspector	(415) 252-3841

8.15.8 References

AGS, Inc. 1999. Geotechnical Study Report, MUNI Metro Rail Light Rail Vehicle Maintenance and Operations Facility. Final. August.

Blake, T. 2000. EQFAULT, Thomas F. Blake Computer Services and Software. Thousand Oaks, California.

CDM (Camp Dresser & McKee, Inc.). 1997. Phase I Environmental Site Assessment. Potrero Power Plant, City and County of San Francisco, California. Prepared for Pacific Gas and Electric. October.

CDMG (California Division of Mines and Geology). 2000. Seismic Hazard Evaluation of the City and County of San Francisco, California, Open-File Report 2000-009.

CDOGGR (California Division of Oil, Gas, and Geothermal Resources). 2003. Oil and Gas Field Maps. http://www.consrv.ca.gov/dog.

Dames and Moore. 2000. Application for Certification. Potrero Power Plant Unit 7 Project. Section 8.15, Geologic Hazards and Resources. Prepared for Southern Company.

Geomatrix. 2000. Report of Additional Site Characterization. Potrero Power Plant Site. April.

Jennings, C. W. 1994. Fault Activity Map of California and Adjacent Areas. Division of Mines and Geology.

Mualchin, L. 1996. A Technical Report to Accompany the Caltrans California Seismic Hazard Map. Prepared for Caltrans by the Office of Earthquake Engineering. July.

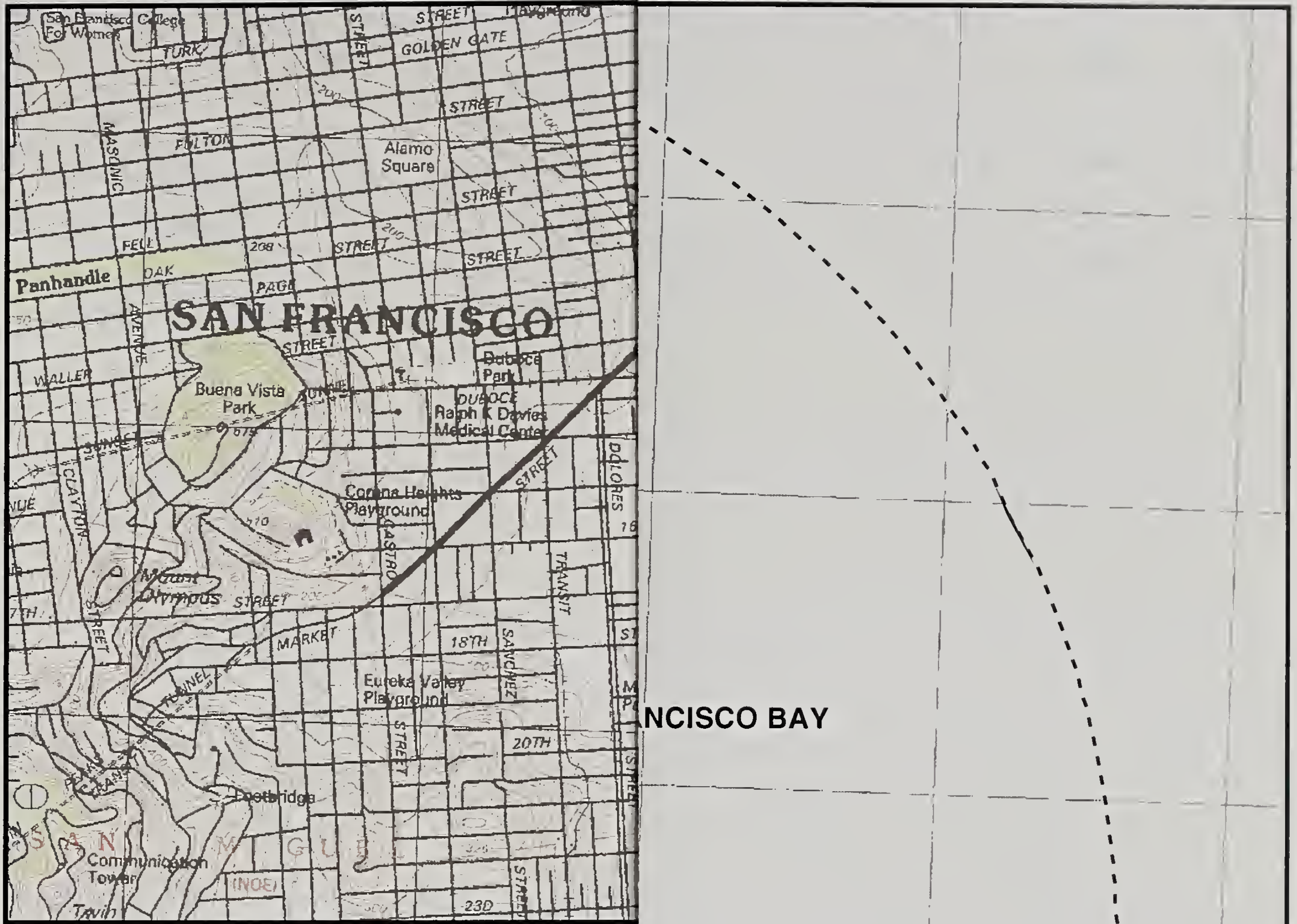
Norris, R. M. and R. W. Webb. 1990. *Geology of California*. Second Edition. John Wiley and Sons. New York.

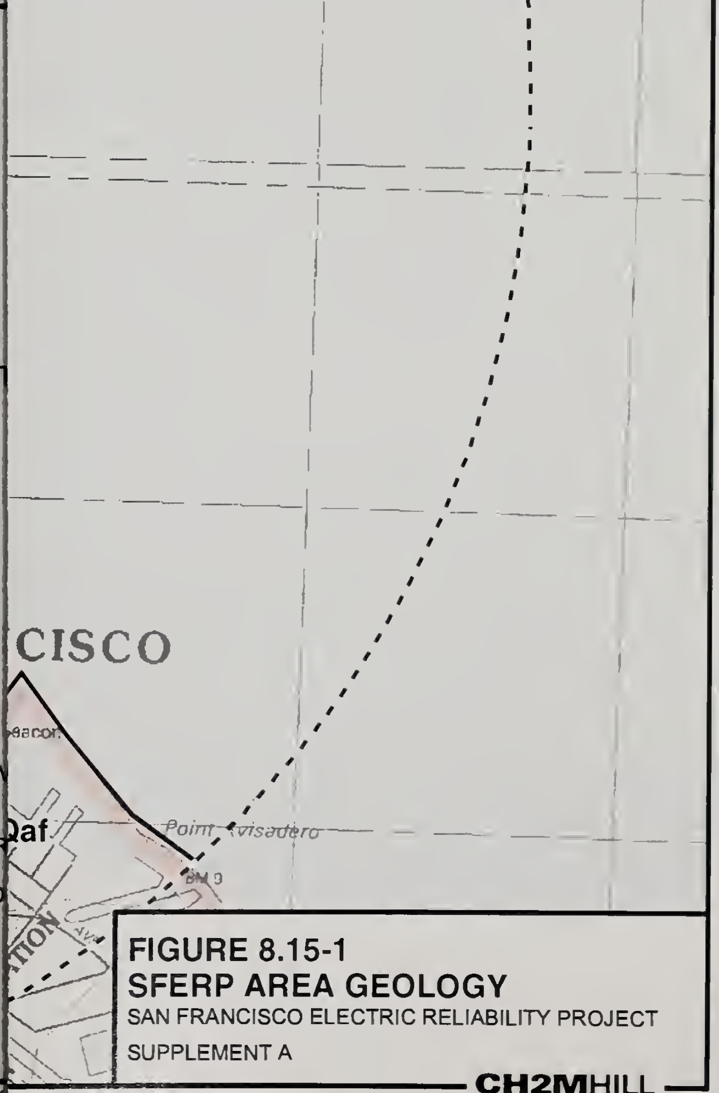
USGS (United States Geological Survey). 2002. National Seismic Hazard Mapping Project. http://geohazards.cr.usgs.gov/eq/.

WGNCEP (Working Group on Northern California Earthquake Potential). 1996. Database of Potential Sources for Earthquakes Larger than Magnitude 6 in Northern California. U.S. Geological Survey. Open-file report 96-705.

WGNCEP (Working Group on Northern California Earthquake Potential). 1999. Earthquake Probabilities in the San Francisco Bay Region: 2000 to 2030 – A Summary of Findings. U.S. Geological Survey. Open-File Report 99-517.

WGNCEP (Working Group on Northern California Earthquake Potential). 2003. Earthquake Probabilities in the San Francisco Bay Region: 2002–2031. U.S. Geological Survey. Open-File Report 03-214.





LEGEND

THRUST FAULT - DASHED WERE APPROXIMATELY LOCATED

FAULT – DASHED WERE CONCEALED

Qaf	ARTIFICIAL FILL
Qd	DUNE SAND
Qu	UNDIFFERENTIATED SURFICIAL DEPOSIT
Kfsh	THIN-BEDDED SANDSTONE AND SHALE
Gs	GREENSTONE
Sp	SERPENTINITE
	SITE LOCATION

NOTE: ALL CONTACTS APPROXIMATE

SOURCE:

1. GEOLOGIC MAP OF PART OF MARIN, SAN FRANCISCO, ALAM CONTRA COSTA, AND SONOMA COUNTIES, CALIFORNIA. MISCELLANEOUS FIELD STUDIES (MF-2337). USGS, 2000.
2. GEOLOGIC MAP OF THE SAN FRANCISCO-SAN JOSE QUADR CALIFORNIA. 1:250,000. REGIONAL GEOLOGIC MAP SERIES, SHEET 1 OF 5. CALIFORNIA DIVISION OF MINES AND GEOLO

0 2,000 4,000 Feet

1:24,000

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FIGURE 8.15-1
SFERP AREA GEOLOGY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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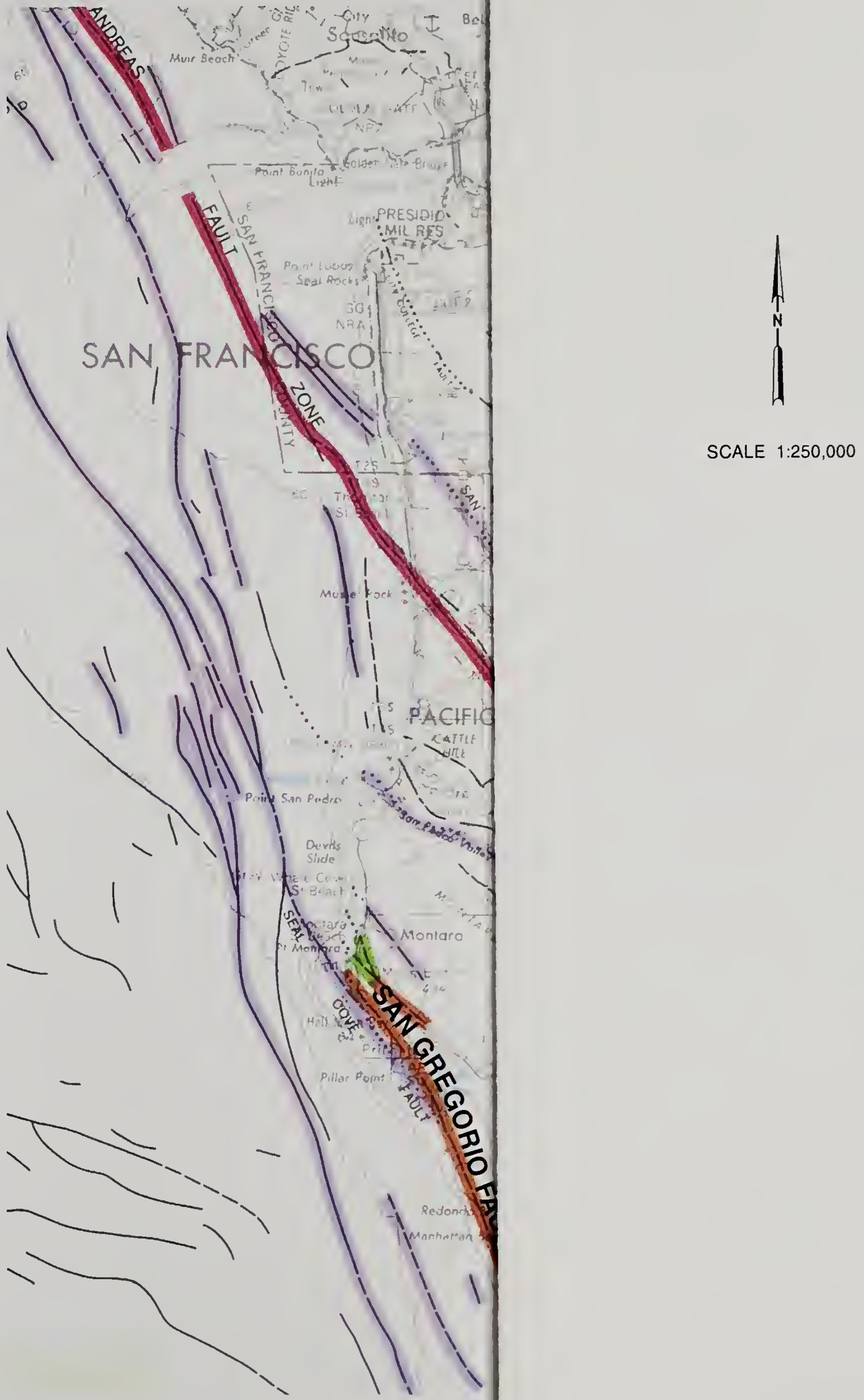
FIGURE 8.15-1
SFERP AREA GEOLOGY
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A



SOURCE: MAP SHOWIN
GEOLOGIC MAP SERIES

FIGURE 8.15-2
SFERP IN RELATION TO PRINCIPAL FAULT ZONES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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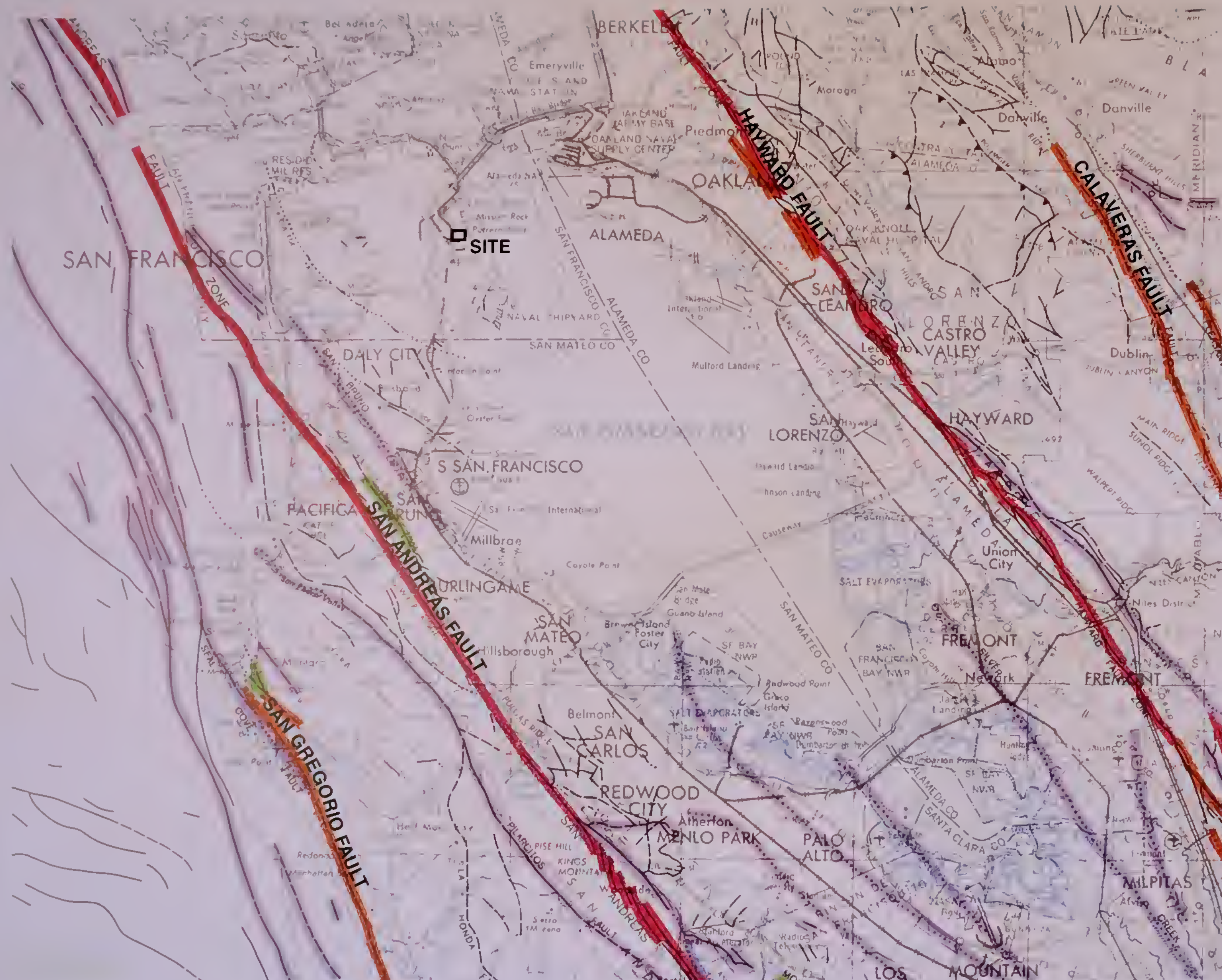

SOURCE: MAP SHOWING RECENCY OF FAULTING, SAN FRANCISCO-SAN JOSE QUADRANGLE, CALIFORNIA. REGIONAL GEOLOGIC MAP SERIES SHEET 5 OF 5. CA. DEPT. OF CONSERVATION DIV. OF MINES AND GEOLOGY 1991.

FIGURE 8.15-2
SFERP IN RELATION TO PRINCIPAL FAULT ZONES
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

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SUBSECTION 8.16

Paleontological Resources

8.16 Paleontological Resources

8.16.1 Introduction

Paleontological resources are fossils, the remains of prehistoric plants and animals, that are important scientific and educational resources because of their use in (1) documenting the presence and evolutionary history of particular groups of extinct and extant organisms, (2) reconstructing the environments in which these organisms lived, and (3) determining the relative ages of the strata in which they occur and the geologic events that resulted in the deposition of the sediments that formed these strata. This subsection summarizes the paleontological resources and the potential impacts on paleontological resources that may result from construction of the San Francisco Electric Reliability Project (SFERP). Prior paleontological resources assessments by Fisk (2004) and Spaulding (2000) are the primary basis for this current assessment. In addition, the current literature was consulted primarily to gain a better understanding of the subsurface stratigraphy that may occur in the project area.

Potential impacts on paleontological resources can be divided into construction-related impacts and impacts related to plant operation. No impacts on paleontological resources are expected to occur from the operation of the SFERP. However, construction-related impacts to paleontological resources could occur as a result of numerous ground disturbing or earth-moving activities during construction. Ground-disturbing and earth-moving activities deeper than the artificial fill at the SFERP site could disturb potentially fossiliferous sediments of the Franciscan Complex and Pleistocene sediments, all of which have produced significant fossils elsewhere. However, although each of the native stratigraphic units that could be impacted by construction are potentially fossiliferous and any fossils discovered could be significant and scientifically important, the overall probability of earth moving related to SFERP construction having adverse impacts to nonrenewable paleontological resources is considered to be low. This is based on the extensive presence of artificial fill and its inferred depth in the Islais Creek estuary. Moreover, potential impacts on paleontological resources resulting from SFERP construction can be mitigated to an insignificant level as described herein. Thus, the proposed project would not cause significant unavoidable adverse impacts as defined by CEQA.

The site proposed for construction is located on a parcel between Cesar Chavez Street and 25th Street to the south and north, respectively, and immediately to the west of Maryland Street, in the Potrero District of the City of San Francisco (City) (see Figure 1-2). The project also includes a construction laydown area immediately to the east of the site. There are four laterals leading variable distances offsite. The first is a process water pipeline that extends along Cesar Chavez Street west to Mississippi Street, and then generally south on Mississippi to a pump station at Marin and Mississippi. The total length of the process water line is 0.76 mile. The second lateral is an electrical transmission line that will first extend west along 25th Street to Michigan, then north on Michigan Street to 24th Street where it extends to the west to Illinois Street. From the intersection of Illinois and 24th Streets the transmission line will continue north on Illinois. Two options are being considered for interconnection to the PG&E Potrero Substation: (1) directly from Illinois and (2) from 22nd Street. The total length of the transmission line will be less than 3,000 feet. A natural gas supply line will lead west from the northwest corner of the SFERP site along 25th Street

to a point of interconnection at Illinois and 25th, a total distance of approximately 900 feet. A short, potable water line will extend south from the southeast corner of the site to a point of interconnection at Cesar Chavez Street, a distance of approximately 300 feet.

8.16.2 Laws, Ordinances, Regulations, and Standards

Paleontological resources are nonrenewable scientific and educational resources and are protected by several federal and state statutes (California Office of Historic Preservation, 1983; see also Marshall, 1976, West, 1991, Fisk and Spencer, 1994, and Gastaldo, 1999), most notably by the 1906 Federal Antiquities Act and other subsequent federal legislation and policies and by the State of California's environmental regulations (California Environmental Quality Act [CEQA], Section 15064.5). Professional guidelines for the assessment and mitigation of impacts to paleontological resources have been disseminated by the Society of Vertebrate Paleontology (SVP). Design and construction of the proposed SFERP will be conducted in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to paleontological resources. Federal and State LORS directly applicable to paleontological resources are summarized in Table 8.16-1 and discussed briefly below, along with relevant County, City, and SVP guidelines.

TABLE 8.16-1
LORS Applicable to Paleontological Resources

LORS	Applicability	Reference	Project Conformity
Federal Antiquities Act of 1906	Protects paleontological resources on federal lands	Subsection 8.16.2.1	Yes
State CEQA, Appendix G	Requires that impacts to paleontological resources be assessed and mitigated on all discretionary projects, public and private	Subsection 8.16.2.2	Yes
California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792)	Defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources	Subsection 8.16.2.2	Yes

8.16.2.1 Federal LORS

Federal protection for significant paleontological resources would only apply to the SFERP if any construction or other related project impacts occur on federally-owned or federally-managed lands. Federal legislative protection for paleontological resources stems primarily from the Antiquities Act of 1906 (PL 59-209; 16 United States Code 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal lands. Since the SFERP site and its linear features do not impact federally-owned or managed land, federal LORS do not apply to this project.

8.16.2.2 State LORS

The California Energy Commission (CEC) environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of the California Environmental Quality Act (CEQA; Public Resources Code Sections 21000 et seq.). CEQA requires that public agencies and private interests identify the potential environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code Section 5020.1 [b]). Guidelines for the Implementation of CEQA (Public Resources Code Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G in Section 15023 provides an Environmental Checklist of questions that a lead agency should address if relevant to a project's environmental impacts. One of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section V, Part c) is the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?"

Although CEQA does not define what is "a unique paleontological resource or site," Section 21083.2 defines "unique archaeological resources" as "…any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. [It] contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. It has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. [It] is directly associated with a scientifically recognized important prehistoric or historic event."

With only slight modification, this definition of "unique archaeological resources" is equally applicable to recognizing "a unique paleontological resource or site." Additional guidance is provided in CEQA Section 15064.5 (a)(3)(D), which indicates "generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history."

Section XVII, Part a, of the CEQA Environmental Checklist asks a second question equally applicable to paleontological resources: "Does the project have the potential to eliminate important examples of the major periods of California history or pre-history?" Fossils are important examples of the major periods of California prehistory. To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is *yes* or *possibly*, a mitigation and monitoring plan should be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes. The lead agency with the responsibility to ensure that fossils are protected during construction of the proposed SFERP is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA

lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resource management are in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the proposed SFERP since construction or other related project impacts would occur on publicly owned or managed lands.

8.16.2.3 County and City LORS

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term general plan for its development. The general plan is a policy document designed to give long range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The general plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its general plan, the local jurisdiction can inform these groups of its goals, policies, and development standards; thereby communicating what must be done to meet the objectives of the general plan.

The current general plan for the City and County of San Francisco (CCSF) (2000) contains no specific requirements, regulations, ordinances, conditions, standards, goals, or objectives designed to mitigate the negative impacts of development on paleontological resources. However, the General Plan contains the following general statement in Policy 1.4: "Assure that all new development meets strict environmental quality standards…." In explaining this policy, the General Plan states: "In reviewing all proposed development for probable environmental impact, careful attention should be paid to upholding high environmental quality standards." In addition, the Environmental Protection section of the Central Waterfront chapter of the general plan states in Objective 7: "Assure that the land resources in San Francisco are used in ways that both respect and preserve the natural values of the land and serve the best interests of all the City's citizens." San Francisco general plan Policy 7.1 states, "Features of a…geological…nature are also important criteria [in determining the value of land] as open space. These natural values of land should be respected." The Preservation Element of the San Francisco general plan presents a comprehensive set of policies for the preservation of San Francisco's cultural resources and defines cultural resources to "include…objects…which are historically or archaeologically significant, or significant in our…scientific…or cultural annals." This section of the General Plan establishes as a goal: "Protect Cultural Resources. Preserve significant cultural resources." Under CEQA, paleontological resources are included as significant cultural resources.

8.16.2.4 Professional Standards

To assist in the compliance with applicable laws, the SVP, an international scientific organization of professional vertebrate paleontologists, has disseminated guidelines

(SVP, 1995; 1996) that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys; monitoring and mitigation; data and fossil recovery; sampling procedures; and specimen preparation, identification, analysis, and museum curation. The SVP's guidelines are a commonly used standard against which paleontological monitoring and mitigation programs are evaluated. Briefly, SVP guidelines recommend that each project have literature and museum archival reviews, a field survey, and, if there is a high potential for disturbing significant fossils during project construction, a mitigation plan that includes monitoring by a qualified paleontological monitor, salvage of fossils if encountered, preparation and identification of salvaged fossils, and placement of curated fossil specimens into a permanent retrievable public museum collection (such as the University of California Museum of Paleontology at Berkeley).

8.16.3 Setting

8.16.3.1 Geographic Setting

Land use in the vicinity of the proposed SFERP project site is predominantly industrial. To the east there is a dock area, and then the San Francisco Bay east of that. The laydown site is located between this dock and the project site (see Figure 1-2). The area surrounding the SFERP site is completely urbanized, with ever increasing industrial development. The site lies in the northern portion of what was once a relatively large estuary at the mouth of Islais Creek, opening to the Bay to the east.

San Francisco Bay fills a north-northwest-trending structural trough in the central Coast Ranges between the San Andreas Fault to the southwest and the Hayward Fault to the northeast. The City of San Francisco is located in the northern portion of the San Francisco Peninsula, which consists of north-northwest oriented ridges comprising the western portion of the Coast Ranges Physiographic Province (Fenneman, 1931; Jahns, 1954). The Great Valley Physiographic Province is to the east and the Pacific Ocean is to the west.

The general project area is located along the western shore of San Francisco Bay, and the SFERP site lies between the low rolling hills of the San Francisco Peninsula to the west and the Bay to the east. Although the modern Bay shoreline is immediately to the east of the site, the site is entirely on historic fill used to "reclaim" this area from the Islais Creek Estuary, south of the bedrock high that forms Potrero Point. The historic shoreline is approximately 730 meters (2,400 feet) west of the project site (Figure 8.3-2), at about the current position of the I-280 freeway.

In general, the topography of the San Francisco Peninsula consists of bedrock hills surrounding narrow valleys filled with unconsolidated deposits. The project area consists of an essentially level surface with an average elevation of only about 13.5 feet above mean sea level. A few small but prominent rocky hills lie within 2.5 kilometers (1.5 miles) of the SFERP site; Potrero Hill to the northwest, Bernal Heights to the west-southwest, and Hunters Point to the south. These topographic highs and their associated drainages are the source of alluvial sediments that extend (or, in geological terms, "transgress") into the Bay during periods of low sea level, such as that of the last glacial age. Historic maps show that, in the vicinity of the Islais and Rincon Creek drainages and the project area, the historic topography descended rather steeply to near sea level. The nearly-level ground that now

extends east from the margin of these topographic highs to the project area is artificial and composed entirely of historic fill.

8.16.3.2 Geologic Setting

The general geology of the San Francisco area has been described in some detail by Taliaferro (1941, 1951), U. S. Army Corps of Engineers (USACE) (1963), Treasher (1963), Trask and Rolston (1951), Goldman (1967, 1969a), Finlayson et al. (1967), Finlayson et al. (1968), Schlocker (1968, 1974), Helley et al. (1979), Wahrhaftig and Sloan (1989), and Wahrhaftig et al. (1993), among others. The geology in the vicinity of the proposed project facilities has been mapped by numerous workers, including Schlocker (1971, 1:500,000 scale); Helley et al. (1979; 1:125,000 scale), Brabb and Pampeyan (1972; 1:62,500 scale), Lajoie et al. (1974; 1:62,500 scale), and Schlocker (1961, 1974; 1:24,000 scale).

Table 8.16-2 shows that there is a general lack of agreement both on the nomenclature and on the age of different stratigraphic units in the San Francisco Bay Area. The details of the sedimentary geology of the San Francisco Bay and vicinity are not well known due to a number of factors. These include the structural and stratigraphic complexity of the area and a lack of exposures for study. Large portions of the area are covered by water, surficial deposits, artificial fill, and development. One cause of the stratigraphic complexity of the area is the change in sedimentary regimes due to glacio-eustatic changes in sea level. During continental glacial maxima, the shoreline lay at about the current position of the Farallon Islands and non-marine sediments were deposited in the Bay. During warmer interglacial periods, such as the current Holocene, sea level rose to fill the Bay and marine sedimentation dominated. These changes from high to low sea level occur in concert with changes from interglacial to glacial conditions as a substantial fraction of the planet's water becomes trapped in continental glacials, thus lowering sea level (hence the term "glacio-eustatic"). These sea level changes have occurred with a frequency of approximately one cycle per 100,000 years for at least the last ca. 700,000 years (Morrison, 1991). The Merced Formation, a relatively complete sequence of marine sediments exposed on the west side of the San Francisco Peninsula above Monterey Bay, documents approximately 30 sea-level transgression events between about 1.5 million years ago and 125,000 years ago (Clifton and Leithold, 1991). Each pronounced event would have resulted in an equally pronounced change in sedimentary regime in the Bay.

A somewhat related cause for confusion in the stratigraphic nomenclature is the change in nature of sediments being laid down at any one time as one moves from terrestrial habitats (sands and gravels comprising alluvial, fluvial, and dune deposits), to estuarine environments (muds and fine sands reflecting lagoonal and estuarine habitats), to deeper water conditions (marine muds and clays). Sediments reflecting these conditions are being laid down at any one time, but because of their lateral continuity they can seldom be traced. Therefore, it is not immediately evident whether any given alluvial deposit recovered close to shore is equivalent in age to a marine unit farther out in the Bay.

Finally, as is well-known, the San Francisco Peninsula lies within a tectonically very active area. For example, the Merced Formation outcrops on the west side of the Peninsula represent a sequence of marine sediments more than 1.7 kilometers thick. This entire stack of sediment appears to have been uplifted by tectonic events during the last ca. 125,000 years. The faulting, warping, and displacement of sediments throughout the

TABLE 8.16-2
Stratigraphic Nomenclature and Age Assignments for Different Stratigraphic Units in the Project Area

Epoch	Glacial Age/ Marine Isotope Stage		Jones and Stokes, 2004	Trask & Rolston, 1951	Sloan, 1992		URS, 2001[a]	CRWQCB, 2004	Fisk, 2004	Clifton and Leithold, 1991
Holocene	Current Interglacial	Mid to Late Stage 1	n.d.	Bay Mud	n.d.		Young Bay Mud	Artificial fill	Artificial fill	n.d.
								? *hiatus* ?	Temescal Formation	
		Latest Stage 2 to Stage 1	Young Bay Mud					Temescal Formation		
Late Pleistocene	Wisconsin Glacial Age (Stages 4-2)		San Antonio Fm	Posey Sand & Merritt Fm	San Antonio Fm.	n.d.	Upper Alluvial/Marine Sediments or San Antonio Fm	Alameda Formation		
				San Antonio Formation						
	Last Interglacial (Stage 5)		Old Bay Mud			Yerba Buena mud	Old Bay Mud or Yerba Buena Fm.		Merritt Sand & Colma Fm[b]	Colma Formation
Early to Middle Pleistocene	Previous glacial-interglacial cycles		? *hiatus* ?	Alameda Formation	n.d.		Lower Alluvial/Marine Sediments (Alameda Fm)- marine facies	? *hiatus* ?	San Antonio Formation	Merced Formation
			Alameda Fm (1.0 to 0.5 my)					Santa Clara Formation		
			Hiatus				Lower Alluvial/Marine Sediments (Alameda Fm)- continental facies			
										n.d.
Major Unconformity										
Late Mesozoic	N/A		Franciscan Complex	Franciscan Complex	n.d.		Franciscan Complex	n.d.	Franciscan Complex	n.d.

Notes:

N/A, not applicable; n.d., not described. Dashed lines are used to designate gradational boundaries.

[a] Stratigraphic superposition, geology and nomenclature described, but no age assignments provided for most units.
[b] Age estimate for this unit not provided.

San Francisco Bay area, even during relatively recent geological time, contributes to the difficulty of relating various sedimentary units to one another.

Rocks and sediments in the general vicinity of the SFERP site can be divided into two distinct domains. The first and by far the oldest is bedrock composed of Mesozoic age (Jurassic and Cretaceous) low-grade metamorphosed sediments named the Franciscan Complex. The Franciscan Complex forms the bedrock "basement" throughout the area. Sediments resting unconformably on the Franciscan Complex constitute the second major grouping. These are much younger, unconsolidated to poorly consolidated deposits that range in age from Pleistocene to Holocene. These have been variously subdivided and named by geologists (see Table 8.16-2). Formal formation names have been applied to the Pleistocene to Recent sedimentary sequence by some authors (see for instance Lawson, 1914). However, many geologists working in the San Francisco Bay area have used informal designations, such as "old bay mud," "sand deposits," and "young bay mud." As noted above, the geographic extent and limiting geologic ages of both the formal and informal stratigraphic units are frequently uncertain.

8.16.4 Resource Inventory

8.16.4.1 Resource Inventory Methods

Recent paleontological resources assessments were completed for the Potrero Power Plant Expansion (Spaulding, 2000) and the original siting of the SFERP (Fisk, 2004), both on Potrero Point approximately 0.5 kilometer (0.3 mile) north of the present project site. Archival record searches (by Spaulding in 1999 and Fisk in 2003) of the University of California Museum of Paleontology (UCMP) in Berkeley, California, were also conducted to gather additional information regarding the occurrence of fossil sites and remains in and near this area. In addition, Rodda and Baghai (1993) provide a relatively recent compendium of vertebrate fossil localities in and near San Francisco. Combined, these studies have thoroughly reviewed the available paleontological data for the study area. Therefore, no additional records search for the current SFERP siting is required to maintain compliance with CEC (2000) and Society of Vertebrate Paleontology (SVP, 1995) guidelines for assessing paleontological resources in areas of potential project impact. In addition, this assessment incorporates a review of the current geological and paleontological literature to further clarify the nature of subsurface stratigraphic units and further evaluate their potential for producing scientifically important paleontological resources.

The SFERP vicinity is thoroughly urbanized with concrete, asphalt, or buildings covering nearly the entire surface area. No rock outcrops or exposures of undisturbed sediments occur on or near the project site. Due to the lack of geological exposures as a consequence of the urbanized nature of the project vicinity, and because the project is sited on artificial fill, no paleontological resources field survey was conducted for this project. Field reconnaissance of the Potrero Point site was done by both Spaulding and Fisk, and Fisk (2004) monitored geotechnical borings at the original SFERP site.

8.16.4.2 Results: Geology and Stratigraphy

The SFERP site and vicinity is located within the "Hunters Point Shear Zone" (Schlocker, 1974), a Jurassic-age fault zone that trends northwestward across the San Francisco Peninsula. This fault zone has been repeatedly reactivated and deformed by translational

movement along the San Andreas Fault system (Wakabayashi, 1992). Movement along this fault zone over time has resulted in rocks being intensely fractured and sheared. Similar major shear zones are found throughout the Bay area. The Hunters Point Shear Zone is over one mile wide and is floored by a melange of various rock types, but is characterized by the metamorphic rock serpentinite (Schlocker, 1974).

Many potentially fossiliferous deposits in the area have limited local exposure and are discontinuous, and their relationships cannot be determined by tracing their lateral continuity due to that lack of exposure. It is evident from Table 8.16-2 that the statement of Savage (1951) applies more than a half-century later: "Many stratigraphic problems still exist in this area despite the fact that these problems have at times received the attention of competent geologists and paleontologists." New excavations therefore have the potential to yield important new information, new fossils, or other field evidence, which could add to, confirm, or clarify previous interpretations, as well as provide a more complete and accurate understanding of both the geological and biological history of the area.

Despite the apparent discrepancies, there is some consensus in these studies as well (Table 8.16-2). The major points of consensus, and therefore reliable aspects of the stratigraphic framework of the study area, include the following:

- The Franciscan Complex forms the basement rock throughout this area. It is of Mesozoic age (Jurassic and Cretaceous).
- A pronounced unconformity separates the "Franciscan Complex" from overlying sediments, representing a hiatus of more than 60 million years.
- The oldest sediments resting on the Franciscan Complex recognized thus far in the Bay Area are apparently early Pleistocene in age. These are usually assigned to the "Alameda Formation," although other nomenclature for these older Pleistocene sediments exists (Table 8.16-2).
- Deposition of fossiliferous sediments in the Bay Area during the Pleistocene was strongly affected by glacio-eustatic changes in sea level as well as by tectonism.
- Sediments representing the last interglacial/glacial/interglacial cycle are well represented in most areas.
- Marine Isotope Stage 5 sediments represent the last interglacial high stand of sea level, and are usually termed the "Old Bay Mud" or "Yerba Buena Formation." Based on the now well-controlled record of sea level rise and fall in response to global interglacial-glacial cycles, the age of the Old Bay Mud ranges between 130,000 and 75,000 years old (Rancholabrean).
- Low sea level during the last glacial age (Marine Isotope Stages 4 through 2) is often represented by alluvial or fluvial sands attributed to the "San Antonio Formation," dating from approximately 75,000 to 10,000 years old.
- Global warming and deglaciation at the end of the last Ice Age led to a marine transgression, and the deposition of the sediments usually identified as "Young Bay Mud." Although these sediments are often assigned a Holocene in age, given the rapid rise in sea level between 15,000 and 10,000 years ago in response to the wasting of the

continental ice sheets, a latest Pleistocene age of lower-most Young Bay Mud in topographic lows would not be unexpected.

- In many areas on the shore of the San Francisco Peninsula, including the present study area, Young Bay Mud is overlain by artificial fill dumped into the Bay in the late 19 and early 20th centuries.

Over the last approximate 700,000 years there have been at least a half-dozen pronounced glacial-interglacial climatic cycles and correspondingly pronounced changes in sea level and sediment deposition. However, only sediments representing the last interglacial-glacial-interglacial cycle, or the last ca. 130,000 years, are widely recognized in the San Francisco Bay area. This suggests that older sediments may be missing or, more likely, that detailed study of the early to middle Pleistocene sediments assigned to the Alameda or San Antonio Formations will eventually reveal a more detailed record of sea level regression and transgression.

The general lack of sediments pre-dating the Pleistocene is also noteworthy. Between the Pleistocene sediments and the Mesozoic Franciscan Complex there are about 60 to 64 million years represented by no sediments whatsoever. The implication is that this region represented a topographic high where erosion rather than sedimentation prevailed. The beginning of tectonic downwarping of the San Francisco Bay trough during the early Pleistocene would account for the initiation of sedimentation represented by the lower-most portion of the Alameda Formation.

8.16.4.2.1 Fossiliferous Sediments. The site proposed for SFERP construction is located entirely on artificial fill. The proposed routes of the process water pipeline and transmission line begin on artificial fill and extend onto areas that were developed on Quaternary alluvium and intertidal deposits. At construction depths, Holocene and then Pleistocene sediments can be expected to be present in the topographic low represented by Islais Creek Estuary. These in turn overlie rocks of the Franciscan Complex. The stratigraphic units with the potential of occurring at the site are individually discussed below, from oldest to youngest.

Mesozoic Rocks of the Franciscan Complex. Bedrock in the vicinity of the SFERP site is composed of altered mafic volcanic rocks (greenstones), sandstone and shale, and serpentinite named the Franciscan Complex (also known as the Franciscan Formation or Franciscan Group). The Franciscan Complex is melange of rock units that were variably deformed and metamorphosed in a subduction zone at the western edge of the North American Plate (Hamilton, 1969; Page, 1981; Wakabayashi, 1992). Franciscan lithologies are predominantly meta-sedimentary rocks with subordinate volcanic rocks that are believed to represent trench fill and volcanic islands, respectively. Although they are uncommon, fossils have been very important in unraveling the ages, depositional environments, and tectonic history of these Franciscan rocks. Major unanswered questions regarding the history of the Franciscan Complex remain (Wakabayashi, 1992).

Within the Franciscan Complex are numerous fault-bounded blocks, each with a distinctive lithology, age, metamorphic grade, and structure, that have been termed tectonostratigraphic terranes (Blake et al., 1982). The San Francisco Peninsula is composed of several coherent tectonostratigraphic terranes separated by major fault zones. The

northwest-southeast trending Hunters Point Shear Zone separates the Alcatraz Terrane to the northeast from the Marin Headlands Terrane to the southwest. The Alcatraz Terrane is composed primarily of early Cretaceous-age sandstones and shales, while the Marin Headlands Terrane contains late Cretaceous-age volcanic rocks (metamorphosed to greenstone) and banded radiolarian cherts. The ages of rocks in the Alcatraz and Marin Headland Terranes is based on fossil evidence (Blake et al. 1982; Wakabayashi, 1992). The predominant rock type found within the Hunters Point Shear Zone is serpentinite and greenstone, with occasional tectonic blocks of sandstones and shales of the Alcatraz Terrane.

Lawson (1895) designated San Francisco as the type area for the Franciscan Complex, and originally divided his Franciscan "Series/Group" into five formations. However, after almost 80 years of further study, Schlocker (1974) considered these formations obsolete and suggested that they be abandoned. Schlocker (1974) used the name Franciscan Formation. However, because the stratigraphy of Franciscan-age rocks is not at all simple, many geologists working in the San Francisco area prefer to use the term Franciscan Complex for this complex assemblage of dissimilar rocks.

Ages of Franciscan Complex rocks vary from place to place (Fox, 1983). Based primarily on fossil evidence, rocks in the sequence have been dated as Jurassic, Cretaceous, and (rarely) Early Tertiary. On the San Francisco Peninsula, Franciscan Complex sedimentary facies of the Alcatraz and Marin Headlands Terranes are Cretaceous in age (Schlocker, 1974). Franciscan Complex bedrock occurs below artificial fill at Potrero Point site, and can be expected to lie at greater depth below artificial fill and Quaternary-age sediments at this site.

Early to Middle Pleistocene Sediments. The oldest sediments overlying the Franciscan Complex basement rocks include those assigned to the San Antonio, Alameda, and Santa Clara Formation (Table 8.16-2). They also include the Irvington Gravel and other older alluvial units deformed by tectonic activity and exposed primarily on the east side of the Bay. On the west side of the San Francisco Peninsula they include the primarily marine Merced Formation. These older stratigraphic units are more consolidated and, therefore, have a distinct geomorphic expression in some areas. Lawson (1914) was among the first to note the dissection and terracing that has occurred since their deposition. These deposits were exposed by sea level lowering and tectonic uplift, and downward cutting by streams left many remnants preserved as topographic highs (Robinson, 1956).

Facies relationships among these older sedimentary units can be expected to be complex. In addition to tectonic deformation, any one unit can be expected to have facies that record terrestrial, estuarine, and marine conditions during one time period. Many areas on the San Francisco Peninsula have alternated between being submerged beneath the Bay and being dry land in response to glacially controlled fluctuations of sea level and, perhaps, tectonic uplift. Depending on whether they were deposited during a high or low sea level stand, sediments can reflect environments varying from estuarine and intertidal mud flats, to swamps, streams and alluvial hill slopes of a terrestrial setting.

Early to Middle Pleistocene age sediments are not known to underlie the SFERP site. However, because the current site lies above a topographic low that represents the historic estuary of Islais Creek, they can be expected at some depth.

Late Pleistocene to Holocene Sediments. Most (but not all) studies in the Bay Area recognize a basal unit relating to the last interglacial sea-level high-stand (Marine Isotope Stage 5; known also as the Sangamon) between about 130,000 and 75,000 years ago. In most cases they rest unconformably on older deformed sediments. In depo-centers such as the Bay, the sediments are usually clays and muds and assigned to the Old Bay Mud or Yerba Buena Formation. On topographically elevated surfaces, however, these sediments are normally coarser grained and, despite the fact that they may simply represent facies changes within the same formation, have most often been assigned different names, in particular the Colma Formation and Merritt Sand.

Sea level regression during the subsequent Wisconsin glacial age (ca. 75,000 to 10,000 years ago) witnessed the retreat of the shoreline westward to about the position of the Farallon Islands. The coarser grained terrestrial sediments relating to this period have been identified as the San Antonio Formation by some authors, and the Merritt Sand or Merritt Formation by others (Table 8-16.2). These coarser sediments are in turn capped by the Young Bay Mud, marking the return of marine deposition to the area between 15,000 and 9,000 years ago. Trask and Rolston (1951) named a sand unit below the Young Bay Mud the Merritt Sand. In their study of Quaternary sediments of the Islais Creek Basin (which includes the SFERP site), Radbruch and Schlocker (1958) simply designated equivalent deposits "the sand layer" but did correlate it with the Merritt Sand. On the east side of San Francisco Bay, Radbruch (1957) showed that the marine type Merritt Sand grades into and interfingers with terrestrial alluvial-fan deposits. Schlocker et al. (1958) named possibly equivalent sands exposed on the San Francisco Peninsula the Colma Formation, while clearly stating that at least the marine portion of the Colma was "correlated with the Merritt Sand."

The Merritt Sand found in the vicinity of the SFERP site is a complex of Pleistocene marine and coastal sediments, including some interbedded gravel, silt, and clay beds. The environment of deposition of Merritt Sand deposits varies greatly over short distances. Depending on whether they were deposited during high or low sea-level, the environment in which they were deposited could vary from offshore marine, estuarine, lagoonal, beach, paludal (swamp), lacustrine (lake), fluvial (stream), flood plain, to dunes (Lawson, 1895; Martin, 1916; Schlocker, 1974). Part of this complexity is no doubt due to the difficulty in discriminating between sand units that may, or may not be related to one another in time and manner of deposition. A sand unit identified as the Merritt Sand by Fisk (2004) was encountered in a geotechnical borehole in the southwestern corner of the Potrero Power Plant and, thus, this unit could be impacted by the placement of concrete piers or support piles in the vicinity of the project site.

Latest Pleistocene and Holocene age younger alluvium in the San Francisco Bay area was named the Temescal Formation by Lawson (1914), who included within this formation alluvial deposits younger than and overlying the Merritt Sand. The principal differences between the younger and older alluvium are stratigraphic position (separated by the Merritt Sand), lithologic components, degree of consolidation, topographic expression, attitude (tilted versus flat-lying), and fossil content. According to Savage (1951), sediments in the San Francisco Bay area containing latest Pleistocene and Holocene fossil faunas can often be distinguished from the older Pleistocene deposits because they are relatively flat-lying, while, in contrast, the older sediments containing early Pleistocene fossil faunas are often slightly tilted. This criterion has also been helpful to others in distinguishing older alluvium

from younger alluvium (see Taliaferro, 1951; Hall, 1958; and Helley et al., 1972). According to Taliaferro (1951), the tilting of early Pleistocene sediments is a direct result of Middle Pleistocene orogeny. However, the firm dating of tilted Colma Formation sediments overlying the Middle Pleistocene Merced Formation on the west side of the San Francisco Peninsula (Clifton and Leithold, 1991) indicates that the timing of deformation varies in the region, and in some areas orogenic (or tectonogenic) tilting occurred during the Late Pleistocene era as well. This is consistent with the fact that different faults in the area have different movement rates and different rupture histories.

Like sediments referred to as the "Old Bay Mud" or San Antonio Formation, depending on whether they were deposited during high or low sea level, the depositional environment of Temescal Formation sediments varies from estuarine to swamp to stream.

The age range for sediments referred to the Temescal Formation is late Pleistocene to Holocene. Kvenvolden (1962) reported radiocarbon dates on samples collected 11 to 20 feet below the surface ranging from about 6,000 to 8,000 years before present. Story et al. (1966) reported radiocarbon ages ranged from 2,500 to 7,500 years for samples collected between 2 and 50 feet below the surface. Schlocker (1974) suggests that these sediments were deposited after about 14,000 years ago, when sea level began to rise with the melting of continental ice sheets at the close of the Wisconsin Glacial Age (Table 8-16.2). Geotechnical investigations at the Potrero Power Plant revealed that sediments referable to the Young Bay Mud underlie artificial fill at a depth below about 20 feet in the southwest corner of the initial SFERP site (Fisk, 2004).

8.16.4.2.2 Non-Fossiliferous Sediments. Included in this definition is artificial fill, which could have fragmentary fossil material transported from other sites. Even if such were the case, this material would be out of stratigraphic context and therefore have no scientific value and minimal educational value.

Artificial Fill. Artificial fill is extensive along the margins of San Francisco Bay. The practice of creating land by placing artificial fill on the gently sloping tidal flats along the eastern margin of the San Francisco Peninsula began about the time of the Gold Rush, when San Francisco became a booming center of growth and needed room to expand, particularly along the waterfront. Over time, more than 3 square miles of the most valuable land in San Francisco originated in this way (Schlocker, 1974). For fill, developers used whatever materials were available, including dune sand, alluvium, sediment dredged from the Bay, spoils from excavations, solid rock from quarries, and man-made debris, including foundry slag and garbage. Both the thickness and type of fill vary widely over short distances. It can be expected to decrease in thickness to the west as the historic shoreline of Islais Creek Estuary is approached (Figure 8.3-2). West of about the current position of I-280 the depth of historic fill is expected to be limited.

8.16.4.3 Results: Paleontological Resources

An inventory of the paleontological resources in or near the proposed project site is presented below and the paleontological importance of these resources is assessed. To the extent possible, they are related to a particular time period and stratigraphic horizon (Table 8.16-2) based on the results of the literature review and UCMP archival records searches conducted by Spaulding (2000) and Fisk (2004). The results also incorporate

surveys of Quaternary land mammal fossils in the San Francisco Bay area made by Stirton (1939, 1951), Hay (1927), Savage (1951), Lundelius et al. (1983), and Jefferson (1991b); surveys of Quaternary birds, reptiles, and amphibians made by Miller and DeMay (1953) and Jefferson (1991a); and a survey of Pleistocene vertebrate fossil localities by Rodda and Baghai (1993). In addition to UCMP localities, Jefferson (1991a; 1991b) listed Rancholabrean-age vertebrate fossil localities of the California Academy of Science Museum (formerly the Golden Gate Memorial Museum), Academy of Natural Sciences Museum in Philadelphia, Field Museum of Natural History in Chicago, U. S. Geological Survey in Denver, U. S. National Museum in Washington, and Yale Peabody Museum. He listed 10 individual sites in San Francisco County and 16 in adjacent San Mateo County that have yielded Rancholabrean vertebrate fossils (Jefferson, 1991a; 1991b).

No previously recorded fossil sites have been documented within the footprint of the SFERP site, adjacent laydown area, or project laterals (pipelines or transmission line). However, each of the stratigraphic units that could possibly be impacted by construction of the SFERP facilities (excluding artificial fill) has produced significant and scientifically important fossils in the San Francisco area. Several have been documented in the vicinity of the Islais Creek estuary. These known fossils and localities are briefly described below starting with those from the oldest stratigraphic unit. Documented paleontological sites within 4.9 kilometers (3 miles) of the project site are shown in confidential Figure 8.16-1.

8.16.4.3.1 Mesozoic Fossils of the Franciscan Complex. Low-grade metamorphic rocks of the Franciscan Complex have produced highly significant fossils at numerous localities in the past. Schlocker (1974) emphasized the importance of fossils in unraveling the ages, depositional environments, and tectonic history of the Franciscan Complex. Schlocker et al. (1958) reported a Cretaceous ammonite found in shales of the Alcatraz Terrane in northeastern San Francisco. Schlocker (1974) also referred to fossil plant remains in Franciscan rocks, although usually with such terms as "carbonaceous matter," "lignitic material," "large carbonaceous particles and layers," "large abundant paper-thin flakes of coaly material…," or "carbon having relict plant-cell structures." Lastly, Schlocker (1974) reported "curved thin shells…that resemble chitinous parts of arthropods and tiny shark's teeth." The latter are the only known vertebrate fossils reported from the Franciscan Complex.

Fossils have also been reported in Franciscan rocks by other geologists and paleontologists. As the name implies, radiolarian chert beds in the Franciscan Complex produce microfossils of radiolarian important as biostratigraphic markers. Fossil radiolaria were first described from Franciscan rocks by Hinde (1894) and later by Riedel and Schlocker (1956). Schlocker (1974) wrote: "In some chert beds fossils are so crowded that they touch each other." Limestone nodules and concretions in Franciscan shales often also contain abundant radiolaria (Schlocker, 1974). Fossil foraminifera have also been reported from Franciscan limestone (Kupper, 1956). Fossil gastropods (snails) and pelecypods (clams) have been reported from a locality on Alcatraz Island and elsewhere by Gabb (1869), Stewart (1930), Anderson (1938), and Ghent (1963). Plant microfossils (pollen and spores) and dinoflagellates have been reported in Franciscan shales (Evitt and Pierce, 1975; Damassa, 1979a, 1979b; Blake et al. 1984), and were instrumental in determining that some rocks included in the Franciscan Complex north of Cape Mendocino are as young as early Tertiary.

Locally, the Franciscan Complex contains a melange of various rock types that vary irregularly over short distances (Schlocker, 1974). Likewise the degree of metamorphic alteration varies in intensity from place to place (Schlocker, 1974). Geotechnical boreholes on Potrero Point indicate that the predominant rock type in the Franciscan Complex is serpentinite (Spaulding, 2000). However, on the slopes of Potrero Hill, approximately 0.5 mile west of the SFERP site and still within the Hunters Point Shear Zone, the Franciscan Complex consists of low-grade metamorphosed "sandstone and shale" (Radbruch and Schlocker, 1958) and "sandstone" (Schlocker, 1974). During a field reconnaissance for the original SFERP siting proceeding, an outcrop of non-fossiliferous, arkosic sandstone was discovered on 20th Street between Pennsylvania and Mississippi Streets (Fisk, 2004), approximately 0.8 mile west of the current SFERP site.

8.16.4.3.2. Early and Middle Pleistocene (Irvingtonian) Fossil Records. From his survey of vertebrate faunas from the non-marine Quaternary deposits of the San Francisco Bay region, Savage (1951) concluded that only two faunal divisions could be recognized. He assigned the earlier Pleistocene fauna to what eventually was designated the Irvingtonian North American Land Mammal Age (NALMA) (older than ca. 400,000 years), and the later Pleistocene and Holocene fauna to the Rancholabrean NALMA (younger than ca. 400,000 years). Deformed gravels with interbedded sand and clay in the San Francisco area that have yielded an abundant Early to Middle Pleistocene Irvingtonian fauna (Savage, 1951; Wahrhaftig et al., 1963; Jefferson, 1991a; 1991b) were called the Irvington Gravels by Savage (1951). The Irvington Gravels are distinctly folded and the strata dip as much as 20 to 25 degrees (Savage 1951, Louderback 1951, Hall 1958).

Fossils from sediments referred to the San Antonio, Alameda, Santa Clara, and Merced Formations of most (but not all, see Table 8.16-2) authors are Early to Middle Pleistocene in age, generally coeval with those reported from the Irvington Gravels and equivalents. The terrestrial mammals collected from these units include mammoths, musk oxen, horses, peccaries, camels, deer, elk, pronghorns, ground sloths, saber-tooth cats, dire wolves, coyotes, foxes, gophers, mice, and squirrels (Peabody, 1945; Savage, 1951; Stirton, 1951; Louderback, 1951; Hall, 1958).

When naming the San Antonio Formation, Lawson (1914) noted that this unit contained bones of extinct vertebrates, including ground sloth, bison, mammoth, mastodon, horse, camels, and large carnivores. Savage (1951) questioned the exact stratigraphic position from which some of these specimens were obtained. Helley et al. (1972) also noted that the older alluvial fan deposits locally contain concentrations of continental vertebrate and invertebrate fossils.

Lithologically similar and probably age-equivalent gravels occur elsewhere in the San Francisco Bay area. These gravels have also yielded Irvingtonian-age land mammal fossils (for instance UCMP localities V-6322, V-3602, V-3604, and V-3605) and are probably correlative with the Irvington Gravels.

8.16.4.3.3 Early Late Pleistocene (Last Interglacial) Fossil Records. The oldest sediments of Late Pleistocene age, usually recorded as unconformably overlying Early to Middle Pleistocene units, are those assigned to the Colma Formation, and also occasionally identified as the Merritt Sand and San Antonio Formation. Marine facies have been identified as the Old Bay Mud or Yerba Buena Mud (Table 8.16-2). There is general

consensus that these sediments date to the Last Interglaciation (Marine Isotope Stage 5; 128,000 to 75,000 years) during which, for part of this time, sea level was actually higher than the present by 2 to 3 meters.

The Rancholabrean NALMA of these faunas, as well as those from the younger overlying units (see below), is based on the presence of fossil bison and many mammalian species that were historic inhabitants of the same area. However, it is evident from the literature that the Rancholabrean NALMA, which began 400,000 to 500,000 years ago (Kurten and Anderson, 1980), is frequently considered to be contemporaneous with the Late Pleistocene, which began about 128,000 years ago at the Marine Isotope Stage 6/5e boundary. This, in addition to other factors listed above, has contributed to the difficulty of knowing precisely which sediments may have yielded a particular fauna, and where they may fall chronologically within the rather long time span of the Rancholabrean.

The Colma Formation has produced significant marine and terrestrial fossils in the past. Rodda and Baghai (1993) reported bones and teeth of mammoth and extinct bison from sands and clays unconformably overlying the Franciscan Complex that they refer to the Colma Formation. Fossil diatoms and pollen were also recovered from this site with the former indicating an estuarine environment. A leg bone of a ground sloth (*Glossotherium* sp.) had been previously recovered from a shallow well in this same vicinity (Winslow, 1876; Stock, 1925; Hay, 1927), which Rodda and Baghai (1993) relate to the same bone bed. A radiocarbon age of 25,380 +/- 1,100 years before present (ibid.) for fossils found at this site would, however, make it too young for the Colma Formation (Stage 5, or 128,000 to 75,000 years old). The standard deviation of the radiocarbon date is large, and it would take only a minute amount of modern carbon to make a sample that is older than the range of radiocarbon dating (>30,000 years for conventional counters), appear to be younger. During excavations for the Broadway Tunnel, a fossil "tree" was discovered and identified by paleobotanist Roland W. Brown as a juniper or red cedar, probably *Juniperus californica* (Schlocker, 1974). Wood from this tree was radiocarbon dated at greater than 30,000 years before present.

Savage (1951) listed other vertebrate fossil localities in the San Francisco Bay region to which he assigned an "undifferentiated Pleistocene" age. Some of these additional vertebrate fossils may also be referable to the Colma Formation. Schlocker (1974) reported fossil plant remains and a peat layer at the top of his Colma Formation, the latter possibly representing "an old soil that developed in or near local marshes or lakes." Marine facies of the Colma Formation (including some units identified as the Merritt Sand) have produced marine megafossils, marine and nonmarine diatoms, and sponge spicules (Schlocker, 1974). Fossil mollusk shell fragments were observed in a core from a depth of approximately 30 feet in what Fisk (2004) identified as the Merritt Sand, in a geotechnical bore hole in the southwestern corner of the initial SFERP site.

8.16.4.3.4 Late Pleistocene (Wisconsin Glacial Age) and Holocene (Current Interglacial) Fossil Records. Numerous Late Pleistocene and Holocene fossils have been reported from sediments referred to variously as the Temescal and San Antonio Formations in the San Francisco area, the marine facies of which appear to be represented by the Young Bay Mud (Table 8.16-2). Hay (1927) listed numerous discoveries made between 1873 and 1927. Peabody (1945) added to this list.

Sediments assigned to the Temescal Formation by Fisk (2004; Table 8.16-2) have yielded fossil remains of petrified wood, marine mollusks and mammals, bony fishes, amphibians, reptiles, birds, and a diversity of extinct land mammals, including ground sloths, mammoth, mastodon, deer, horse, camel, and bison (Hay, 1927; Stock, 1925; Miller and Peabody, 1941; Savage, 1951; Jefferson, 1991b; UCMP records). Fossils recovered from Wisconsin and Holocene-age sediments at sites in the area around San Francisco Bay also include microfossils useful in paleoenvironmental reconstructions (radiolaria, foraminifera, sponge spicules, coccoliths, diatoms, dinoflagellates, pollen, and spores) (Atwater et al., 1977; McGann et al., n.d.; Sloan 1992). Schlocker (1974) has also reported fossil plant remains from sediments he referred to as "Bay mud and clay." Bonilla (1971) reported fossil shells and plant remains from "Bay Mud." Where applied, the use of microfossils has promise in clarifying stratigraphic and facies relationships of these various sedimentary units.

A number of fossil sites are reported as having been discovered during excavations associated with construction projects, including the Bay Bridge, Bay Shore Southern Pacific Tunnel, Twin Peaks Tunnel, construction of an office building on Pacific Street, and construction of the Southeast Sewage Treatment Plant (now known as the Southeast Water Pollution Control Plant) (Radbruch and Schlocker, 1958; Jefferson, 1991a, 1991b, Rodda and Baghai, 1993; UCMP records).

Remains of land mammals have been found at a number of localities in younger alluvium (Louderback, 1951; Savage, 1951; Stirton, 1951; Jefferson, 1991b). The most common vertebrate fossils reported from Rancholabrean-age alluvial sediments in the San Francisco Bay area are the remains of extinct mammoth, bison, and horse.

UCMP vertebrate fossil locality V-65243, known as the Twin Peaks Tunnel site, located approximately 4.7 kilometers (2.9 miles) northwest of the SFERP site, produced Rancholabrean-age fossils. In the vicinity of the Islais Creek Channel about 0.4 kilometers (1,200 feet) south of the SFERP site, UCMP locality V-3410 yielded a sparse Rancholabrean-age fossil fauna. Radbruch and Schlocker (1958) also reported the recovery of fossils from borings in the Islais Creek area in sediment identified as Old Bay Mud (Table 8.16-2). Radbruch and Schlocker (1958) also reported the discovery of fossil plants and mollusk fossils in an excavation at the Southeast Sewage Treatment Plant (now known as the Southeast Water Pollution Control Plant). Two localities in South San Francisco (UCMP localities V-6203 and V-6319) have also produced Rancholabrean faunas, including bison and elk or moose. During construction of the San Francisco-Oakland Bay Bridge, part of a jaw of a bison with several teeth, bones and teeth of horses, and a mammoth tooth were collected from sediments considered to be late Pleistocene (Louderback 1951, Savage 1951). These localities are now referred to as UCMP localities V-34011 and V-69186. Abundant fossil mollusk shells were observed in cores of Young Bay Mud from depths of approximately 20 and 25 feet in a geotechnical borehole in the southwestern corner of the initial SFERP site.

8.16.4.3.5 Artificial Fill. No fossils have been recorded from artificial fill in the San Francisco Bay area. However, since artificial fill includes sediments from the older formations discussed above, it is possible that such fossils exist. Such fossils would have been transported from their original source and would be lacking stratigraphic context and provenance. An unconsolidated sand containing mollusk shell fragments was observed in cores from depths of approximately 10 and 15 feet in a geotechnical borehole in the south-central portion of the

initial SFERP site. This sand was underlain by deposits of foundry slag, charcoal, and ash, clearly demonstrating that the shell-bearing sand is artificial fill.

8.16.5 Impacts

The potential environmental impacts on paleontological resources from construction and operation of the SFERP are presented in the following subsections.

8.16.5.1 Discussion of Impacts

8.16.5.1.1 Paleontological Resource Significance Criteria. In its guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of sensitivity for paleontological resources: high, low and undetermined. The paleontological importance or sensitivity of a stratigraphic unit reflects its potential paleontological productivity (and thus sensitivity), and the scientific significance of the fossils it has produced. Thus, the potential paleontological productivity of a stratigraphic unit exposed in a project area is based on the abundance of fossil specimens and/or previously recorded fossil sites in exposures of the unit in and near that project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit are most likely to yield fossil remains in quantity (and quality) similar to those previously recorded from that unit near the project site.

An individual fossil specimen is considered scientifically important and significant if it is (1) identifiable, (2) complete, (3) well preserved, (4) age diagnostic, (5) useful in paleoenvironmental reconstruction, (6) a type or topotypic specimen, (7) a member of a rare species, (8) a species that is part of a diverse assemblage, and/or (9) a skeletal element different from, or a specimen more complete than, those now available for that species (SVP, 1995). For example, identifiable land mammal fossils are considered scientifically important because of their potential use in providing age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Although fossil plants are usually considered of lesser importance because they are less helpful in age determination, they are actually more sensitive indicators of their environment and, thus, as sedentary organisms, more valuable than mobile mammals for paleoenvironmental reconstructions. For marine sediments, invertebrate fossils, including microfossils, are scientifically important for the same reasons that land mammal and/or land plant fossils are valuable in terrestrial deposits. The value or importance of different fossil groups varies depending on the age and depositional environment of the stratigraphic unit that contains the fossils.

The following tasks were completed to establish the paleontological importance and sensitivity of each stratigraphic unit exposed in or near the project site:

- The potential paleontological productivity of each rock unit was assessed, based on the abundance of fossil remains and/or previously recorded and newly documented fossil sites it contains in and/or near the project site.
- The scientific importance of fossil remains recorded from a stratigraphic unit exposed in the project site was assessed.

- The paleontological importance of a rock unit was assessed, based on its documented and/or potential fossil content in the project site and surrounding area.

This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

Under SVP (1995) standard guidelines, stratigraphic units in which fossils have been previously found are deemed to have a high sensitivity and a high potential to produce additional fossils. In areas of high sensitivity, full-time monitoring by a professionally trained paleontologist is recommended during any project ground disturbance. Stratigraphic units that are not sedimentary in origin or that have not been known to produce fossils in the past are deemed to have low or undetermined sensitivity and monitoring is usually not recommended nor needed during project construction in these units.

After reconnaissance surveys, observation of exposed strata, and possibly subsurface testing, a qualified paleontologist can usually determine whether the stratigraphic unit should be categorized as having high, low, or undetermined sensitivity; that is, whether there is a high, low, or undetermined potential to encounter fossil resources during construction. In keeping with the significance criteria of the SVP (1995), all vertebrate fossils are categorized as being of significant scientific value and all stratigraphic units in which vertebrate fossils have previously been found in stratigraphic context have high sensitivity. According to SVP (1995) standard guidelines, sensitivity comprises both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, or stratigraphic data.

Using the criteria of the SVP (1995) the significance of the potential adverse impacts of earth moving on the paleontological resources of each stratigraphic unit potentially present near the SFERP site was assessed. This assessment reflects the paleontological importance/impact sensitivity of the stratigraphic unit, which, in turn, reflects the potential for fossil remains and fossil sites being encountered during earth moving activities. However, it should be noted that any impact on a fossil site or a fossil-bearing rock unit during construction would be considered significant, regardless of the previously determined paleontological importance of the rock unit in which the site or fossiliferous layer occurs. For example, grading in an area underlain by a rock unit with low sensitivity would have only a low potential to disturb fossil remains (i. e., the rock unit would have low sensitivity to adverse impacts). However, the loss of any fossil remains from that rock unit would be a significant impact.

8.16.5.2 Paleontological Resource Impact Assessment

The significance of potential adverse impacts of SFERP project-related earth moving during construction on the paleontological resources of the stratigraphic units likely to be disturbed at the project site is presented in this section.

8.16.5.2.1 Franciscan Complex. The predominant rock type found in Franciscan Complex rocks of the Hunters Point Shear Zone is serpentinite, although sedimentary rocks resembling those of the Alcatraz Terrane have been previously identified on Potrero Hill immediate west of the project area (Schlocker, 1974). Serpentinite is a metamorphic rock believed to have formed from either ultramafic igneous rocks or sediments high in

manganese and iron and low in silica. Even though the original parent material may have been sediments, they have been subjected to high pressures and temperatures either prior to or during intrusion along fault zones. Metamorphism resulting from these high pressures and temperatures would have destroyed any fossils present. Therefore, the serpentinite basement rock in the project area is considered to have no sensitivity. However, because there is a possibility that excavations may encounter blocks of fossil-bearing sedimentary rocks such as those present on the northeast slopes of Potrero Hill less than 0.8 kilometers (0.5 mile) west of the SFERP site (Schlocker, 1974), overall the Franciscan Complex is still considered to have low sensitivity rather than none.

Sedimentary rocks of the Franciscan Complex have in the past produced very significant fossils, which have been important for understanding the age, depositional environments, and tectonic history of rocks in the San Francisco area. Although no previously reported fossils are known to directly underlie the proposed SFERP site, the presence of sedimentary rocks on Potrero Hill, less than 0.8 kilometers (0.5 mile) west of the SFERP site, suggests that there is a potential for similar rocks being uncovered during SFERP construction-related excavations. Therefore, using SVP (1995) criteria, rocks of the Franciscan Complex (not including the serpentinite) have a low sensitivity to impacts from SFERP construction. Additional fossil remains discovered in rocks of the Franciscan Complex during SFERP construction could be scientifically important and significant.

8.16.5.2.2 Early to Middle Pleistocene Sediments. A number of fossil localities are known from the Early to Middle Pleistocene sediments in the San Francisco region, although no previously reported fossils are known to come from these older deposits in the vicinity of the proposed SFERP site. Nonetheless, using SVP (1995) criteria these sediments have high sensitivity. There is only a low potential for similar scientifically important fossil remains being discovered in the deepest excavations at the proposed SFERP site. Additional fossil remains discovered in sediments of the San Antonio Formation and equivalents (Table 8.16-2) during SFERP construction could be scientifically important and significant.

8.16.5.2.3 Early Late Pleistocene Sediments. The Merritt Sand, Old Bay Mud, and equivalents (Table 8.16-2) have produced significant fossils at numerous previously recorded fossil localities in the San Francisco Bay area, including in a geotechnical borehole at the initial SFERP site. The presence of these fossil sites suggests that these sediments have the potential to produce additional similar fossil remains during deep excavations at the current proposed SFERP site. Therefore, they possess high sensitivity and additional identifiable fossil remains recovered from these sediments during SFERP construction could be significant and scientifically important.

8.16.5.2.4 Late Pleistocene and Holocene Sediments. Sediments referable to the Temescal Formation, Young Bay Mud, and equivalents have produced numerous significant plant, invertebrate, and vertebrate fossils at numerous previously recorded fossil sites. Several previously recorded fossil localities are recorded in the vicinity, including sites containing vertebrate fossils within the limits of the Islais Creek estuary. In addition, abundant fossil mollusks were observed in sediments assigned to the Temescal Formation by Fisk (2004) in a borehole in the southwestern corner of the initial SFERP site. The presence of these previously recorded fossil sites in Late Pleistocene to early Holocene sediments suggests that there is a high potential for additional similar fossil remains to be uncovered by

excavations for SFERP construction. Therefore, using SVP (1995) criteria, these sediments have high sensitivity to impacts from construction; additional fossil remains discovered in these sediments during SFERP construction could be scientifically important and significant.

8.16.5.2.5 Artificial Fill. Although artificial fill may contain fossils transported from its source, those fossils would be lacking stratigraphic context and provenance and, therefore, would have only limited scientific and educational value. There is concurrence among paleontologists and land managers that fossils not in situ, that is those that have been removed from their initial stratigraphic context and that cannot be confidently related to a particular stratigraphic unit, are not scientifically significant. This is due to the fact that, in the absence of stratigraphic, and therefore chronologic and geologic context, a fossil cannot be used to effectively address important scientific research questions. Therefore, artificial fill possesses a low sensitivity to impacts from construction.

8.16.5.3 Summary of Paleontological Resources Assessment

Potential adverse impacts on paleontological resources resulting from the proposed SFERP are summarized in this section. Potential impacts on paleontological resources can be divided into construction-related impacts and impacts related to plant operation. No impacts on paleontological resources are expected to occur from the operation of the SFERP. However, construction-related impacts to paleontological resources could occur as a result of numerous ground disturbing or earth-moving activities during construction. These impacts could be either direct or indirect. Direct impacts could result from excavations for foundations, trenching for burial of the pipelines, and any other earth-moving activity that disturbed previously undisturbed native sediment. Although earth moving associated with construction would be a comparatively short-term activity, the loss of fossil remains, unrecorded fossil sites, associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata would be a long-term environmental impact.

Site grading is not expected to result in significant adverse impacts to paleontological resources, as the ground surface in the area is already relatively flat, and is composed of artificial fill. Neither are the support facilities, such as temporary construction offices, proposed laydown area(s), and parking areas expected to have a significant adverse impact on paleontological resources, as they also would be located on ground previously disturbed and will involve no significant new ground disturbance. However, excavations deeper than the artificial fill at the SFERP site could disturb potentially fossiliferous sediments of the Franciscan Complex and Pleistocene sediments, all of which have produced significant fossils elsewhere. Trenching for pipeline or utilities burial could disturb the paleontologically sensitive sediments. In conclusion, project-related ground-disturbing and earth-moving activities could potentially have adverse impacts on significant paleontological resources in any of the sediments and rocks present underlying the proposed SFERP site, except for artificial fill. However, although each of the native stratigraphic units that could be impacted by construction are potentially fossiliferous and any fossils discovered could be significant and scientifically important, the overall probability of earth moving related to SFERP construction having adverse impacts to non renewable paleontological resources is considered to be low. This is based on the extensive presence of artificial fill and its inferred depth in the Islais Creek estuary.

8.16.6 Mitigation

8.16.6.1 Environmental Checklist

The Guidelines for the Implementation of CEQA (Public Resources Code Sections 15000 et seq.) include as one of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section XIV, Part a) the following: "Would the project directly or indirectly destroy a unique paleontological resource or site…?" Because of potential adverse impacts on significant paleontological resources resulting from SFERP construction, mitigation measures are necessary.

8.16.6.2 Proposed Mitigation Measures

This section describes applicant-proposed mitigation measures that would be implemented to reduce potential adverse impacts to significant paleontological resources resulting from SFERP construction. These proposed paleontological resource impact mitigation measures would reduce to an insignificant level the direct, indirect, and cumulative adverse environmental impacts on paleontological resources that might result from project construction. The mitigation measures proposed below are in compliance with CEC environmental guidelines (CEC, 2000) and with SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources (SVP, 1995; 1996).

8.16.6.2.1 Paleontological Monitoring. Prior to construction, a qualified paleontologist will be retained to both design and implement a monitoring and mitigation program. During construction, earth moving construction activities will be monitored where these activities will potentially disturb previously undisturbed native (other than artificial fill) sediment. Monitoring will not be conducted in areas where the ground has been previously disturbed, in areas of artificial fill, in areas immediately underlain by serpentinite or greenstone, or in areas where exposed sediment will be buried, but not otherwise disturbed.

8.16.6.2.2 Paleontological Resource Monitoring and Mitigation Plan. The paleontological resource monitoring and mitigation plan (PRMMP) will include a description of where and when construction monitoring will be required; emergency discovery procedures; sampling and data recovery, if needed; preparation, identification, analysis, and museum curation of any fossil specimens and data recovered; preconstruction coordination; and reporting.

This monitoring and mitigation plan will be consistent with Society of Vertebrate Paleontology standard guidelines for the mitigation of construction-related adverse impacts on paleontological resources (SVP, 1995), as well as the requirements of the designated museum repository for any fossils collected.

Scientific recovery, preparation, identification, determination of significance, and curation into a public museum is considered by the SVP (1995) to adequately mitigate impacts to paleontological resources in most circumstances. Therefore, the implementation of these mitigation measures would reduce the potentially significant adverse environmental impact of project-related ground disturbance and earth moving on paleontological resources to an insignificant level by allowing for the recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise would be lost to earth moving and to unauthorized fossil collecting. With a well designed and implemented paleontological resource monitoring and mitigation plan, project construction could actually

result in beneficial impacts on paleontological resources through the possible discovery of fossil remains that would not have been exposed without project construction and, therefore, would not have been available for study. The identification and analysis of fossil remains discovered as part of project construction could help answer important questions regarding the geographic distribution, stratigraphic position, tectonic history, and age of fossiliferous sediments in the San Francisco area.

8.16.6.2.3 Construction Personnel Education. Prior to start of construction, construction personnel involved with earth-moving activities will be informed that fossils may be encountered, on the appearance of fossils, and on proper notification procedures. This worker training will be prepared and presented by a qualified paleontologist.

8.16.6.3 Significant Unavoidable Adverse Impacts

Because potential impacts on paleontological resources resulting from SFERP construction can be mitigated to an insignificant level, the proposed project would not cause significant unavoidable adverse impacts as defined by CEQA.

8.16.6.4 Cumulative Impacts

Disturbance or destruction of paleontological resources during project excavation has the potential to contribute to cumulative impacts. Impacts from this and other projects that may take place in the reasonably foreseeable future could cumulatively result in significant, adverse impacts to paleontological resources. These impacts would include the destruction of nonrenewable paleontological resources as a consequence of disturbance by earth-moving, and the consequent loss of their scientific data and educational potential.

However, if paleontological resources are encountered during project-related ground disturbance, the potential cumulative impacts would be low as long as the mitigation measures proposed above are fully implemented to recover the resources, they are identified, their significance is determined, a written report is prepared, and they are curated into a public museum. When properly implemented, the mitigation measures proposed above would effectively recover the value to science of any significant fossils discovered during SFERP project construction. Thus, the proposed project would not cause or contribute to significant cumulative impacts to paleontological resources.

8.16.7 Involved Agencies and Agency Contacts

There are no state or local agencies having specific jurisdiction over paleontological resources. The CEQA lead agency having specific responsibility to ensure that paleontological resources are protected in compliance with CEQA and other applicable statutes during construction of the SFERP is the CEC. California Public Resources Code Section 21081.6, entitled Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

8.16.8 Permits Required and Permit Schedule

No state or local agency requires a paleontological collecting permit to allow for the recovery of fossil remains discovered as a result of construction-related earth moving on private or public lands, except for federal lands. Removal of paleontological resources from

federal lands requires a Cultural Resource Use Permit from the Bureau of Land Management. However, since no federal lands are involved in this project, no permits will be required.

8.16.9 References

Anderson, F. M. 1938. Lower Cretaceous Deposits in California and Oregon: *Geological Society of America Special Paper.* 16, 339 p.

Atwater, B. F., Hedel, C. W., and Helley, E. J. 1977. Late Quaternary Depositional History, Holocene Sea-Level Changes, and Vertical Crustal Movement, Southern San Francisco Bay, California. *U. S. Geological Survey Professional Paper.* 1014, 114 p.

Blake, M. C., Jr., Howell, D. G., and Jayko, A. S. 1984. Tectonostratigraphic Terranes of the San Francisco Bay Region: p. 5-22. In Blake, M. C., Jr. (editor). 1984. *Franciscan Geology of Northern California, Pacific Section of the Society of Economic Paleontology and Mineralogy.* Vol. 43, 324 p.

Bonilla, M. G. 1971. Preliminary Geologic Map of the San Francisco South Quadrangle and Parts of the Hunters Point Quadrangle, California. U. S. Geological Survey Miscellaneous Field Studies Map MF-311, scale 1:24,000.

Brabb, E. E., and Pampeyan, E. H. 1972. Preliminary Geologic Map of San Mateo County, California. U. S. Geological Survey Miscellaneous Field Studies Map MF-328, scale 1:62,500.

California Energy Commission (CEC). 2000. Paleontological Resources. p. 35. In *Energy Facility Licensing Process – Developer's Guide of Practices & Procedures.* 70 p.

California Office of Historic Preservation. 1983. *Summary of State/Federal Laws Protecting Cultural Resources.* 10 p.

City and County of San Francisco (CCSF). 2000. General Plan.

Clifton, H. E., and E. L. Leithold. 1991. Quaternary Coastal and Shallow Marine Facies Sequences, Northern California and the Pacific Northwest. In Quaternary Non-Glacial Geology: Conterminous U. S., Roger B. Morrison, ed. pp. 143-156. Geological Society of America, Boulder, CO.

CRWQCB (California Regional Water Quality Control Board). 2004. Santa Clara Valley Groundwater Basin, East Bay Plain Subbasin. California Groundwater Bulletin 118. Last update 2004. www.dpla2.water.ca.gov/publications/groundwater/bulletin118/ basins/ pdfs_desc/2-9.04.pdf.

Damassa, S. P. 1979a. Eocene Dinoflagellates from the Coastal Belt of the Franciscan Complex, Northern California. *Journal of Paleontology.* Vol. 53, No. 4, p. 815-840.

Damassa, S. P. 1979b. Danian Dinoflagellates from the Franciscan Complex, Mendocino County, California. *Palynology.* Vol. 3, pp. 191-207.

Evitt, W. R., and Pierce, S. T. 1975. Early Tertiary Ages from the Coastal Belt of the Franciscan Complex, Northern California. *Geology.* Vol. 3, No. 8, pp. 433-436.

Fenneman, N. M. 1931. *Physiography of Western United States*. McGraw-Hill Book Company. New York, NY, 534 p.

Finlayson, D. J., Hansen, W. R., and Ford, R. S. 1967. Evaluation of Ground Water Resources, South Bay – Appendix A, Geology. *California Department of Water Resources Bulletin*. No. 118-1, 153 p.

Finlayson, D. J., Hammersmith, E., and Hansen, W. R. 1968. Evaluation of Ground Water Resources, South Bay — Volume 1, Fremont Study Area. *California Department of Water Resources Bulletin*. No. 118-1, 117 p.

Fisk, L. H., 2004. Paleontological Resources. Subsection 8.16 in San Francisco Electric Reliability Project Application for Certification. Prepared by CH2H HILL. Submitted to the California Energy Commission on behalf of the City and County of San Francisco (04-AFC-1).

Fisk, L. H., and Spencer, L. A. 1994. Highway Construction Projects Have Legal Mandates Requiring Protection of Paleontologic Resources (Fossils): P. 213-225. In Scott F. Burns (editor). 1994. *Proceedings of the 45th Highway Geology Symposium*. Portland, Oregon. 258 p.

Fox, K. F. 1983. Tectonic Setting of Late Miocene, Pliocene, and Pleistocene Rocks in Part of the Coast Ranges North of San Francisco, California. *University of California Publications in Geological Sciences*. Vol. 36, pp. 147-198.

Gabb, W. M. 1869. Cretaceous and Tertiary Fossils. *California Geological Survey Paleontology*. Vol. 2, 289 p.

Gastaldo, R. A. 1999. International Laws: Collecting, Transporting and Ownership of Fossils - USA. P. 330-338. In T. P. Jones and N. P. Rowe (editors). 1999. *Fossil Plants and Spores*. The Geological Society. London, England. 396 p.

Ghent, E. D. 1963. Fossil Evidence for Maximum Age of Metamorphism in Part of the Franciscan Formation, Northern Coast Ranges, California. *California Division of Mines and Geology Special Report*. 82, p. 41.

Goldman, H. B. 1967. *Geology of San Francisco Bay*. San Francisco Bay Conservation and Development Commission. San Francisco, California. 58 p.

Goldman, H. B., 1969a. Geology of San Francisco Bay. P. 11-29. In H. B. Goldman (editor). 1969. Geologic and Engineering Aspects of San Francisco Bay Fill. *California Division of Mines and Geology Special Report*. 97, 130 p.

Goldman, H. B. 1969b. Salt, Sand, and Shells. P. 31-40. In H. B Goldman (editor). Geologic and Engineering aspects of San Francisco Bay Fill. *California Division of Mines and Geology Special Report*. 97, 130 p.

Hall, C. A., Jr. 1958. Geology and Paleontology of the Pleasanton Area, Alameda and Contra Costa Counties, California. *University of California Publications in Geological Sciences*. Vol. 34, No. 1, pp. 1-90.

Hamilton, W. B. 1969. Mesozoic California and Underflow of the Pacific Mantle. *Geological Society of American Bulletin*. Vol. 80, pp. 2,409-2,430.

Hay, O. P. 1927. The Pleistocene of the Western Region of North America and Its Vertebrate Animals. *Carnegie Institute of Washington Publication*. 322(B), 346 p.

Helley, E. J., and Miller, D. M. 1992. Geologic Map of the Newark 7.5 Minute Quadrangle, Alameda County, California. U. S. Geological Survey Open-File Report 92-312, Scale 1:24,000.

Helley, E. J., Lajoie, K. R., and Burke, D. B. 1972. Geologic Map of Late Cenozoic Deposits, Alameda County, California. U. S. Geological Survey Miscellaneous Field Studies Map MF-429. Scale 1:62,500.

Helley, E. J., Lajoie, K. R., Spangle, W. E., and Blair, M. L. 1979. Flatland Deposits of the San Francisco Bay Region, California — Their Geology and Engineering Properties, and Their Importance to Comprehensive Planning. U. S. Geological Survey Professional Paper 943. 88 p.

Hinde, G. J. 1894. A Note on the Radiolarian Chert from Angel Island and from Buri-Buri Ridge, San Mateo County, California. *University of California Publications, Department of Geology Bulletin*. Vol. 1, pp. 235-240.

Jahns, R. H. (Editor). 1954. Geology of Southern California. *California Division of Mines Bulletin*. 170, 289 p.

Jefferson, G. T. 1991a. A Catalogue of Late Quaternary Vertebrates from California, Part One, Nonmarine Lower Vertebrate and Avian Taxa. *Natural History Museum of Los Angeles County Technical Reports.* Number 5, 60 p.

Jefferson, G. T. 1991b. A Catalogue of Late Quaternary Vertebrates from California, Part Two, Mammals. *Natural History Museum of Los Angeles County Technical Reports.* Number 7, 129 p.

Jones & Stokes. 2004. Chapter 8, Geology and Soils. Napa River Salt Marsh Restoration Project Final Environmental Impact Report. Prepared for the Coastal Conservancy. April, 2004.

Kupper, K. 1956. Upper Cretaceous Pelagic Foraminifera from the "Antelope Shale," Glenn and Colusa Counties, California. Cushman Foundation Foraminiferal Research Contributions. Vol. 7, Part 2, pp. 40-47.

Kurten, Bjorn, and E. Anderson. 1980. Pleistocene Mammals of North America. Columbia University Press, New York.

Kvenvolden, K. A. 1962. Normal Paraffin Hydrocarbons in Sediments from San Francisco Bay, California. *American Association of Petroleum Geologists Bulletin*. Vol. 46, No. 9, pp. 1,643-1,652.

Lajoie, K. R., Helley, E. J., Nichols, D. R., and Burke, D. B. 1974. Geologic Map of Unconsolidated and Moderately Consolidated Deposits of San Mateo County, California. U.S. Geological Survey Miscellaneous Field Studies Map MF-575, scale 1:62,500.

Lawson, A. C. 1895. Sketch of the Geology of the San Francisco Peninsula: U. S. Geological Survey 15th Annual Report. pp. 401-476.

Lawson, A. C. 1914. San Francisco Folio. U. S. Geological Survey Atlas No. 193, 24 p.

Louderback, G. D. 1951. Geologic History of San Francisco Bay. *California Division of Mines Bulletin*. 154, P. 75-94.

Lundelius, E. L., Jr., Graham, R. W., Anderson, E., Guilday, J., Holman, J. A., Steadman, D. W., and Webb, S. D. 1983. Terrestrial Vertebrate Faunas. P. 311-353. In Porter, S. C. (Editor). *Late Quaternary Environments of the United States, Volume 1, The Late Pleistocene*. University of Minnesota Press, Minneapolis, MN. 407 p.

McGann, Mary, D. Sloan, and E. Wann. n.d. Biostratigraphy Beneath Central San Francisco Bay along the San Francisco-Oakland Bay Bridge Transect. geopubs.wr.usgs.gov/prof-paper/pp1658/ch3.pdf.

Marshall, L. G. 1976. Paleontological Salvage and Federal Legislation. *Journal of Paleontology*. Vol. 50. P. 346-348.

Martin, B. 1916. The Pliocene of Middle and Northern California. *University of California Publications, Department of Geology Bulletin*. Vol. 9, pp. 215-259.

Miller, L. H., and DeMay, L. 1953. The Fossil Birds of California: An Avifauna and Bibliography with Annotations. *University of California Publications in Zoology*. Vol. 47, P. 47-142.

Morrison, R. B. 1991. The Geology of North America, Volume K-2, Quaternary Non-Glacial Geology, Conterminous U.S. Geological Society of America, Boulder, CO.

Page, B. M. 1981. The Southern Coast Ranges. P. 329-417. In Ernst, W. G. (Editor). *The Geotectonic Development of California*. Rubey Volume 1. Prentice-Hall, Englewood Cliffs, NJ. 706 p.

Peabody, F. E. 1945. An Occurrence of Late Pleistocene Mammals in the San Francisco Peninsula. *Journal of Paleontology*. Vol. 19, No. 1, pp. 60-63.

Radbruch, D.H., and Schlocker, J. 1958. Modified from USGS San Francisco South and San Francisco North 1:24,000-scale topographic maps.

Radbruch, D. H., and Schlocker, J. 1959. Engineering Geology of Islais Creek Basin San Francisco, California. U. S. Geological Survey Miscellaneous Geologic Investigations, Map I-264, scale 1:12,000.

Riedel, W. R., and Schlocker, J. 1956. Radiolaria from the Francisco Group, Belmont, California. *Micropaleontology*. Vol. 2, No. 4, pp. 357-360.

Robinson, G. D. 1956. Geology of the Hayward Quadrangle, California. U. S. Geological Survey Map GQ 88, scale 1:24,000.

Rodda, P. U., and Baghai, N. 1993. Late Pleistocene Vertebrates from Downtown San Francisco, California. *Journal of Paleontology*. Vol. 67, pp. 1,058-1,063.

Savage, D. E. 1951. Late Cenozoic Vertebrates of the San Francisco Bay Region. *University of California Publications, Bulletin of the Department of Geological Sciences*. Vol. 28, No. 10, pp. 215-314.

Schlocker, J. 1974. Geology of the San Francisco North Quadrangle, California. U.S. Geological Survey Professional Paper 782, 109 p., scale 1:24,000.

Schlocker, J., Bonilla, M. G., and Radbruch, D. H. 1958. Geology of the San Francisco North Quadrangle, California. U. S. Geological Survey Miscellaneous Geologic Investigations Map I-272, scale 1:24,000.

Sloan, Doris. 1992. The Yerba Buena mud: Record of the last-interglacial predecessor of San Francisco Bay, California. Geological Society of American Bulletin 104: 716-727.

Society of Vertebrate Paleontology (SVP). 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontologic Resources – Standard Guidelines. *Society of Vertebrate Paleontology News Bulletin.*, Vol. 163, pp. 22-27.

Society of Vertebrate Paleontology (SVP). 1996. Conditions of Receivership for Paleontologic Salvage Collections. *Society of Vertebrate Paleontology News Bulletin.* Vol. 166, pp. 31-32.

Spaulding, W. G. 2000. Paleontological Resources Assessment, Potrero Power Plant Expansion, City and County of San Francisco, California. Unpublished report prepared for Southern Energy/Mirant Corporation by URS Corporation, San Francisco, California. 10 p.

Stewart, R. B. 1930. Gabb's California Cretaceous and Tertiary Type Lamellibranches. *Philadelphia Academy of Natural Science Special Publication.* 3, 314 p.

Stirton, R. A. 1939. Cenozoic Mammal Remains from the San Francisco Bay Region. *University of California Bulletin of the Department of Geological Sciences.* Vol. 24, No. 13, pp. 339-410.

Stirton, R. A. 1951. Prehistoric Land Animals of the San Francisco Bay Region. *California Division of Mines Bulletin.* 154, pp. 177-186.

Stock, C. 1925. Cenozoic Gravigrade Edentates of Western North America with Special Reference to the Pleistocene Megalonychinae and Mylodontidae of Rancho La Brea. *Carnegie Institute of Washington Publication.* 331, 206 p.

Taliaferro, N. L. 1941. Geologic History and Structure of the Central Coast Ranges of California. *California Division of Mines Bulletin.* 118, pp. 119-163.

Taliaferro, N. L. 1951. *Geology of the San Francisco Bay Counties: California Division of Mines Bulletin.* 154, pp. 117-150.

Trask, P. D., and Rolston, J. W. 1951. Engineering Geology of the San Francisco Bay, California. Geological Society of America Bulletin. Vol. 62, No. 9. pp. 1,079-1,109.

Treasher, R. C. 1963. Geology of the Sedimentary Deposits in San Francisco Bay, California. California *Division of Mines and Geology Special Report.* 82, p. 11-24.

URS Corporation, 2001. Appendix B, Preliminary Study of Subsurface Conditions. San Francisco – Oakland Airport Connector An Initial Investigation. Draft, June 2001.

U. S. Army Corps of Engineers (USACE). 1963. Comprehensive Survey of San Francisco Bay and Tributaries, California — Geology, Soils and Construction Materials: Appendix E to the Technical Report on San Francisco Bay Barriers. 144 p.

Wahrhaftig, C., Radbruch, D. H., and Case, J. E. 1963. The Berkeley Hills and Livermore Valley, Alameda and Contra Costa Counties, California. Guidebook to Field Trips in Alameda and Contra Costa Counties, California. Cordilleran Section Geological Society of America, 49th Annual Meeting. Berkeley, California, pp. 1-27.

Wahrhaftig, C., and Sloan, D. (Editors). 1989. Geology of San Francisco and Vicinity. 28th International Geological Congress Field Trip Guidebook T105. 59 p.

Wahrhaftig, C., Stine, S. W., and Huber, N. K. 1993. Quaternary Geologic Map of the San Francisco Bay 4° x 6° Quadrangle, United States. U. S. Geological Survey Miscellaneous Investigations Map I-1420, scale 1:1,000,000.

Wakabayashi, J. 1992. Nappes, Tectonics of Oblique Plate Convergence, and Metamorphic Evolution Related to 140 million years of Continuous Subduction, Franciscan Complex, California. *Journal of Geology*. Vol. 100, pp. 19-40.

West, R. M. 1991. State Regulation of Geological, Paleontological, and Archaeological Collecting – 1991. Unpublished manuscript, American Museum of Natural History. New York, NY. 30 p.

Winslow, C. F. 1876. [Untitled communication]: Proceedings of the California Academy of Sciences. Vol. 6, p. 141.

FIGURE 8.16-1

SFERP Area Paleontological Resources and Geology (Confidential)

Figure 8.16-1, SFERP Area Paleontological Resources and Geology, was submitted separately under a request for confidentiality.

SECTION 9.0

Alternatives

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Alternatives

9.1 Introduction

The California Environmental Quality Act (CEQA) requires consideration of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" [14 CCR. 15126.6(a)]. Thus, the focus of an alternatives analysis should be on alternatives that "could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects" [14 CCR 15126.6(c)]. The CEQA Guidelines further provide that "[a]mong the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (i) failure to meet most of the basic project objectives, (ii) infeasibility, or (iii) inability to avoid significant environmental impacts" (*Id.*).

On December 4, 2002, the City and County of San Francisco (CCSF) Board of Supervisors passed Resolution 827-02 adopting an Electricity Resource Plan (revised December 2002). The Electricity Resource Plan was prepared by the San Francisco Public Utility Commission (SFPUC) and the San Francisco Department of Environment (SFE) pursuant to the requirement of Ordinance 124-01. The Electricity Resource Plan provided the context for the development of the San Francisco Electric Reliability Project (SFERP). As explained in Section 3.0, Purpose and Need, the Electricity Resource Plan establishes priorities and provides for the development of a portfolio of new energy resources to shut down the Hunters Point power plant and Potrero Unit 3 and to set the City on a sustainable course that shows a progressive decline in dependence on fossil fuels while meeting the City's electric reliability requirements. The portfolio of new resources includes energy efficiency improvements, renewables, distributed generation using renewable and clean technologies, transmission additions and new, highly efficient and operationally flexible gas-fired generation at appropriate sites. The SFERP constitutes part of the new, highly efficient and operationally flexible component of the plan. Selected recommendations presented in the Electricity Resource Plan applicable to the proposed project are presented below.

- **Recommendation 1.B.22.** The City should expeditiously develop sufficient highly efficient and operationally flexible new generating resources to enable the closure of Hunters Point Unit 4 by the end of 2004. The amount of new generation needs to satisfy Independent System operation (ISO) reliability requirements based on objective load flow analyses.
- **Recommendation 1.B.23.** The City should facilitate the early retirement of Potrero Unit 3 to avoid costly upgrades and the extended operation of this outdated plant. New City power facilities used as replacement power must reduce air emissions.
- **Recommendation 1.B.25.** The quantity of new natural gas-fired generation procured by the City should be based on a California Independent System Operator (CAISO)-reviewed load flow study that determines the amount of power necessary to

maintain system reliability while complying with all state and federal environmental regulations. All studies will be based on the latest CAISO-accepted electricity demand forecast. Whenever investment in demand-side management programs and sustainable resources can offset new fossil fuel development to meet demand forecasts, this will be the City's preferred course.

9.2 Project Objectives

The SFPUC has identified several basic objectives, based on the findings and recommendations contained in the Electricity Resource Plan, for the development of a power project. These objectives include:

1. Facilitate the shutdown of older, more polluting in-City generation (consistent with ERP Recommendation 1.B.22 and 1.B.23).
2. Minimize local impacts of electrical generation.
3. Maintain the City of San Francisco's electric reliability (consistent with ERP Recommendation 1.B.25).

The remainder of this section sets forth the alternative project sites evaluated, as well as an evaluation of other generation and emission control technologies.

9.3 No Project Alternative

9.3.1 Description

If the No Project alternative is selected, the City would not receive authorization to construct and operate a new power generation facility. Energy required for local reliability and peaking requirements that would have been produced by the SFERP would need to be generated by another local source, such as the Potrero power plant. As Section 3.0, Purpose and Need, describes, currently the sources of power that are available are older power generation facilities (Potrero and Hunters Point power plants). These power plants release larger quantities of NO_x than the proposed facility and have questionable reliability because they are between 27 and 45 years old. The Hunters point power plant is expected to shut down once the Jefferson-Martin 230-kV transmission line is placed in service. However, as described in Section 3, Purpose and Need, without the SFERP, there is currently no certain known alternative to eliminate the reliability must run agreement for the Potrero power plant and thus facilitate its closure.

The No Project alternative is not considered feasible because it does not meet the objectives for the development of new power generation facilities to close down existing, dirty generation facilities that impact low income/minority communities while maintaining local electric reliability.

9.3.2 Potential Environmental Impacts

The proposed project will produce electricity to maintain the local electrical system's reliability while discharging less NO_x emissions for each energy unit generated when

compared to other existing, older fossil fuel generation facilities. Further, the superior operating flexibility of the proposed combustion turbines, that is, a 10-minute start versus the current 24-hour start times for Potrero 3 and Hunters Point 4, affords operators greater flexibility in dispatching plants to meet system requirements. These characteristics provide beneficial environmental impacts.

Potential environmental impacts from the No Project alternative would result in greater NO_x emissions because new power plants, including the proposed project, would not be brought into operation to facilitate the closure of older, higher NO_x-emitting plants.

9.4 Proposed and Alternative Sites

The City desires to facilitate the shutdown of older in-City generation while maintaining the reliability of the local electrical system. To meet these objectives, extensive electrical studies were conducted by CAISO. In November 2004, CAISO approved the SF Action Plan, which provides that, upon construction of Jefferson-Martin, the Hunters Point Power Plant can be shut down. Potrero Unit 3 can then be released from its Reliability Must Run (RMR) contract if the SFERP is developed within the City and a fourth combustion turbine is located at the San Francisco International Airport.

For the three combustion turbines that comprise the SFERP, the site selection criteria used to screen project sites focused on parcels located north of Martin Substation in industrially zoned areas, near necessary infrastructure (i.e., 115-kV electrical substations and natural gas lines). The City sought to site the proposed project near a 115-kV electrical substation to avoid potential power flow imbalances that could be caused by line outages. Areas around the 115-kV substations (Larkin, Mission, Potrero, and Hunters Point) were reviewed to narrow down the best substation area to site the project, and then to identify available parcels for a power plant.

The Larkin Substation was eliminated from consideration because there is no industrially zoned land in the vicinity. While there is some industrial land adjacent to Mission Substation, this substation was eliminated from consideration to site three combustion turbines because there was insufficient land to locate multiple combustion turbines in the vicinity, and because of the expense of a natural gas interconnection in this area. In addition, the Mission Substation is surrounded by commercial/residential uses. Thus, a further rationale for eliminating the Mission Substation from consideration was the potential impact on neighboring residences.

The Hunters Point Substation was eliminated from the analysis due to environmental justice concerns. Specifically, communities in the vicinity of Hunters Point Substation have borne and continue to bear the impacts of substantial industrial activity, most notably the Hunters Point Power Plant and the Southeast Water Pollution Control Plant. To ameliorate environmental justice concerns, it has been the City's objective since 1998 to close down the Hunters Point Power Plant. Given the longstanding impacts of the Hunters Point Power Plant on the local communities, and continued community concerns about the impacts from Southeast Water Pollution Control Plant, City policy makers are determined to avoid siting any new City-sponsored generation in the Hunters Point area.

The remaining substation, Potrero Substation, was thus identified as the most promising for interconnection of the SFERP. Although environmental justice concerns also exist with regard to communities in the vicinity of Potrero Substation, the City is seeking to address these concerns through project configuration, design and mitigation as is described in Section 4.0, Environmental Justice. Some of the benefits of the proposed project site are its proximity to the Potrero Substation and a major PG&E natural gas line.

9.4.1 The Proposed Site

The proposed site for SFERP is a 4-acre parcel owned by the City, as described in more detail in Section 1.0, Executive Summary, and Section 2.0, Project Description. This site (the "MUNI" site), which is located between 25th Street and Cesar Chavez Street and approximately 720 feet east of Illinois Street, is industrial land surrounded by industrial development. The site is currently used for temporary industrial purposes. For example, a temporary concrete batch plant currently occupies the northern portion of the site. The Port of San Francisco's Pier 80 marine terminal is located immediately adjacent and to the south. MUNI is planning to build a new streetcar maintenance facility, MUNI Metro East, on the 13-acre parcel due west of the proposed project site. A concrete, ready mix plant and a drayage company border the site on the north. The site is located in the City of San Francisco and is zoned for industrial use. Development of a power plant in this area would be consistent with the San Francisco General Plan and zoning ordinance.

The site is near PG&E's 115-kV Potrero Substation, located between 22nd and 23rd Street on Illinois Street. The existing substation will have sufficient transmission capacity to serve a new 145-MW plant, when the Potrero-Hunters Point (AP-1) 115-kV underground cable is projected to be completed (late 2005). Natural gas would be supplied from the PG&E gas transmission main located at Illinois and 25th streets. Additional natural gas compressors would be necessary. Water supply for the proposed plant would be obtained from the City's combined sewer system via an effluent pumping station—to be located near Marin and Cesar Chavez streets, a pipeline, and an onsite primary, secondary, and tertiary treatment system that will produce Title 22-quality recycled water. Wastewater from the plant would be returned to the combined sewer system.

The plant would be located in an industrial area of San Francisco and would be partially screened by several industrial structures at the proposed MUNI Metro East streetcar maintenance facility. The nearest uses are located approximately 1,600 feet from the site.

9.4.2 Alternative Sites

9.4.2.1 Configuration

The proposed project configuration is the result of considering a variety of design and operating limitations. The main factors affecting the configuration include available gas turbine generators provided as a result of the State of California's settlement with the Williams Companies, the need for fast-starting electrical generation to increase electrical reliability in San Francisco, environmental justice, and cost. The City reviewed a number of configurations including siting all four combustion turbines at one site, siting three combustion turbines at one site and one combustion turbine elsewhere, siting two combustion turbines at one site and two elsewhere, and lastly, returning the combustion turbines to the

State of California and not siting any combustion turbines (the No Project Alternative). After analyzing the possible variations, the City determined that siting multiple combustion turbines at one site offered several advantages; most notably, lower capital and operating costs, and reduced permitting and construction schedules. However, in order to distribute the impacts of power generation more equitably, the City is currently proceeding with siting three units at the MUNI site and the fourth unit at the San Francisco International Airport.

9.4.2.2 Alternative Sites

Five sites were identified as potentially suitable to site multiple turbines. Figure 9-1 (figures are located at the end of this section) shows the location of the alternative sites that were potentially suitable for construction of SFERP.

9.4.2.3 Alternative Site Selection Criteria

The criteria developed to evaluate the alternative sites' suitability for the SFERP correspond with the reasons the proposed site was selected. These criteria include the following:

- Environmental justice considerations
- Availability of sufficient land area
- Proximity to an existing substation
- Proximity to PG&E main gas pipeline
- Consistency with the General Plan and zoning ordinances, height restrictions, and existing land uses
- The ability, with implementation of reasonable mitigation measures, to have a less-than-significant impact on the environment
- Location in area appropriate for industrial development

The alternative site locations, shown in Figure 9-1, were evaluated using the above criteria. The site characteristics are summarized in Table 9-1 and described in the following subsections.

TABLE 9-1
Comparison Using Site Selection Criteria

Alternative Site	Site Size (acres)	Land Use Compatibility	Available Linear Facilities[a]	Distance to Residential[b]
MUNI Site (proposed site)	4	Zoned: Industrial; undeveloped	W: <0.8 mile G: <0.2 mile T: <0.6 mile	1,600 feet
Mirant Site	4.5	Zoned: Industrial	W: 1.0 mile G: <0.1 mile T: <0.1 mile	600 feet
Western Pacific Site	9	Zoned Industrial undeveloped	W: <0.9 mile G: <0.4 mile T: 0.8 mile	2,000 feet

TABLE 9-1
Comparison Using Site Selection Criteria

Alternative Site	Site Size (acres)	Land Use Compatibility	Available Linear Facilities[a]		Distance to Residential[b]
Port of San Francisco's Pier 70	5	Zoned: Industrial; developed and part of historic district	W: G: T:	<1.3 mile <0.2 mile <0.1 mile	900 feet
Cesar Chavez Street	2.8	Zoned: Industrial	W: G: T:	<0.8 mile <0.4 mile <1.0 mile	1,400 feet
Illinois Street	11	Zoned: Industrial; developed	W: G: T:	<1.1 mile <0.1 mile <0.1 mile	600 feet

Notes:
[a] W: = recycled water; G: = natural gas; T= transmission.
[b] Distances rounded to the nearest 100 feet.

9.4.2.3 Alternative Site Descriptions

In this section, each of the alternative sites is described and analyzed based on its feasibility for use. Environmental considerations are presented in Subsection 9.4.3. The City's rationale for selecting the MUNI site is summarized in Subsection 9.5.

9.4.2.3.1 Western Pacific Site. The Western Pacific site is an approximately 9-acre parcel under the jurisdiction of the Port of San Francisco (Port) and is subject to the State Lands trust. As such, this 9-acre parcel is subject to the public trust for navigation, waterborne commerce and fisheries. The Port plans to develop and integrate the 9-acre Western Pacific parcel into the Port's Pier 80 operations through the creation of a Pier 80 Terminal Complex. This Complex will add open yard and covered shed space to accommodate cargo distribution, assembly, and processing related to the Pier 80 terminal operations. Siting the project on the Western Pacific 9-acre parcel may not be compatible with the Port's plans to enhance its marine terminal capabilities at Pier 80. In addition, although electric power plants that depend upon navigable waters to operate have been permitted on trust lands, the proposed project does not require a waterfront location for its operation. The common law Public Trust doctrine, and the cases interpreting the doctrine, recognize that trust lands may be used for purposes that are not inherently water dependent, but that directly promote trust purposes. Examples of this type of use would be cargo warehouses or railroad terminals. Since the proposed project does not clearly satisfy the criteria for trust permitted uses, a proposed use of the 9-acre Western Pacific parcel for this purpose may be subject to scrutiny by the Attorney General, who is charged with enforcement of trust restrictions, and the State Lands Commission, a state agency responsible for overseeing local trust grantees. Given the issues of compatibility with the Port's marine terminal plans, and the uncertainty as to consistency of the use under the trust doctrine, the entitlement process for the project use at this location would be lengthy, and the outcome uncertain.

9.4.2.3.2 Mirant Site. The Mirant site is located north of the proposed project site on a 4.5-acre parcel of land that is a portion of the 26 acre Potrero Power Plant, which is currently owned by Mirant Potrero, LLC (Mirant), a wholly owned subsidiary of Mirant Corporation. The

project site formerly housed several industrial activities including a blacksmith shop, the turbine hall of PG&E's decommissioned Station A, a natural gas storage tank, a gas compressor building, a gas metering building, and a maintenance facility. Three large buildings on the site: Station A, the compressor building and the metering building, date back to the early 1900s. The site is zoned heavy industrial and is surrounded with commercial and industrial facilities. PG&E's Potrero substation is located immediately adjacent and to the west. Other industrial uses are located east and north of the site including the Potrero Power Plant Unit 3, a 206-MW natural-gas-fired, boiler-steam turbine-generator and three diesel fueled, simple cycle peaking combustion turbines, units 4, 5 and 6, each rated at 51 MW. The site is near PG&E's natural gas load center, where the three natural gas transmission pipelines that serve the City connect to a common header. The nearest residential receptors are located approximately 600 feet from the site.

Mirant Corporation is currently under bankruptcy protection, delinquent in taxes owed to the City and a defendant in recently settled legal actions brought by the State regarding Mirant's conduct during the State's energy crisis. In addition, the City has opposed Mirant's proposed plan to build a new 540 MW combined cycle power plant, Potrero 7, on this site. Over the past year, the City and Mirant engaged in protracted negotiations for the purchase by the City of the Mirant site. Notwithstanding its best efforts, the City was unable to conclude an option agreement with Mirant, in part due to the need for bankruptcy court approval of any agreement. Thus, in late 2004, the City concluded that a change of site was necessary to support timely development the SFERP.

9.4.2.3.3 Port of San Francisco's Pier 70. The Port of San Francisco's Pier 70 site is located adjacent to and north of the Potrero Power Plant. The site is a 5-acre parcel of industrial land in an area zoned Heavy Industrial. This land is currently used for vehicle storage by the City's car towing contract operator. The site is near PG&E's Potrero 115-kV Substation and natural gas load center.

Property surrounding the site is used for industrial/commercial uses, with the Potrero Power Plant located immediately south; the Port of San Francisco surrounds the site on the north, east, and west.

The nearest residential receptors are located approximately 900 feet from the site.

The Pier 70 site was acquired by the San Francisco Port Commission from Bethlehem Steel Corporation, and is held subject to the terms of a statutory trust grant (California Statutes of 1968, Chapter 1333, the Burton Act). The site was not historically tide or submerged land, and thus is not subject to the common law use restrictions imposed under the Public Trust doctrine. However, once the property was acquired by the Port, its use was limited by the Burton Act. This Act authorizes the Port Commission to lease land for non-trust purposes, if the property is not required for the trust purposes specified in the statute, provided that the use is in the public interest. The San Francisco Charter adds an additional condition, requiring the Port to obtain maximum profit from the use of lands deemed surplus to the needs of the trust, so that the revenue can be used to support the Port's public trust objectives.

This portion of the Pier 70 complex is currently occupied in part by a group of structures referred to as the Building 12 complex. Pier 70 is the site of an industrial complex of about 30 buildings associated with the former Union Iron Works and Bethlehem Steel Shipyard.

This complex has been the subject of several historical resources surveys that have consistently determined that the area is potentially eligible for the National Register of Historic Places as a historic district. To be compatible with the area's status as a potential historic district, the combustion turbines would need to be erected within the Building 12 complex and the complex would need to be rehabilitated to retain its historic character. There is community resistance to this location due to the desire to see it later developed as part of the historic district redevelopment.

9.4.2.3.4 Cesar Chavez Site. The Cesar Chavez site is located near the Port of San Francisco's container terminal, near the Western Pacific site. The site is 2.8 acres, and includes a building that would require demolition. The site is developed and zoned heavy industrial. The surrounding land uses are industrial, with the Port's container terminal located to the south, industrial uses to the north, and MUNI is planning to site a new streetcar maintenance facility due west of the site.

The nearest residential receptors are located approximately 1,400 feet from the site.

The site is near PG&E's Potrero Substation and natural gas pipeline and water supply and discharge would be via the combined sewer system.

A major disadvantage of the Cesar Chavez site is that the owner has not shown any interest in selling the property to the City notwithstanding a number of overtures by the City to commence negotiations in late 2003 and early 2004.

A further disadvantage of the property is that the parcel size is considered small, and at best minimally adequate for the installation of the SFERP. The small size would require designing the power plant with a compressed layout. This effort would increase construction and maintenance costs for the project. In addition, there would be no space available for a water treatment facility, requiring that this equipment be located elsewhere.

9.4.2.3.5 Illinois Street Site. The Illinois Street site is located south of the proposed project site. The site is approximately 11 acres of developed land that is zoned heavy industrial and is surrounded by industrial uses to the north, south, and east, with commercial/industrial land uses to the west. Existing structures on the site will require demolition and the site is within 600 feet of residential areas.

The site is near PG&E's Potrero Substation and natural gas pipeline and water supply and wastewater discharge would be via the combined sewer system.

Ownership of the Illinois Street site is complex, involving a variety of owners and real estate trusts. These entities, as represented by the managing owner, did not appear to be interested in selling the property to the City in the 2003-early 2004 timeframe when the City was exploring alternative sites. Moreover, the shape of the parcel is irregular, including a large amount of land that would be of little use to the City and that contains buildings of potential historic importance, most notably warehouses from the sugar refinery. In preliminary negotiations, the City was informed that if it proceeded with a transaction at all, the owners would likely insist on sale of the entire parcel because fragmentation would likely render the remaining property unsaleable. Thus, the cost to the City would likely increase because the City would be required to buy more property than it needs.

9.4.3 Environmental Considerations

In this section, the potential environmental impacts of the four alternative sites and the No Project Alternative are discussed. Potential environmental impacts from use of the proposed site are presented in more detail in each of the 16 environmental subsections of Section 8 of the AFC. Table 9-2 (located at the end of this section) provides a summary of the impacts of each alternative site compared to the proposed site. The No Project Alternative would not meet the basic project objectives of the City of facilitating the closure of existing in-City generation and maintaining reliability. Although the No Project Alternative would not result in the impacts associated with the SFERP, environmental impacts from the No Project Alternative could be more severe to the extent that as a result of the No Project Alternative, it remains infeasible to shut down existing dirtier within-City generation.

9.4.3.1 Air Quality

The plant's configuration and operation would be essentially the same from an air quality perspective at every location. The type and quantity of air emissions from the alternative sites would be identical. However, the impacts on the human population and the environment may differ slightly because of the location of residences and other human uses in the project vicinity. All of these sites are in the same air basin and offsets acquired by the City would be equally appropriate for every site. Potential impacts of the project to residents are discussed in Subsection 8.6, Public Health, and potential impacts on wildlife are discussed in Subsection 8.2, Biological Resources.

With the No Project Alternative, air quality in the Bay Area Air Quality Management District (BAAQMD) would be slightly worse than with the project. There would be no permanent reduction in air pollutants resulting from the purchase of emission reduction credits. The in-City generation required to maintain electrical reliability would have to be provided by the existing, older generating plants. These older generating plants would create more air pollution than the proposed project. Thus, overall, the air quality would be worse than if the plant were built.

9.4.3.2 Biological Resources

As the proposed site and all of the alternative sites are urban—developed sites with little biological habitat value—the potential biological impacts associated with the development of a power plant on each of these sites would be similar. These potential biological impacts are associated with the power plant features and not necessarily the habitat value of the sites. The biological impacts presented for the proposed site (presented in Subsection 8.2.4 of the AFC) would be expected for all of the alternative sites. These impacts would include air quality impacts to sensitive habitats (none are present in the local area), noise and light emissions from the power plant, collision and electrocution potential for tall project features.

The No Project Alternative would result in the continued operation of older in-City power plants, which would result in higher levels of air pollutants emitted per unit of electricity produced. Additionally, these older power plants use bay waters for their once-through cooling systems. These cooling systems are known to entrain aquatic species in the cooling water, which would result in higher biological impacts relative to the development of a new power plant that would use recycled water in the cooling water system.

9.4.3.3 Cultural Resources

The area surrounding the alternative sites, Potrero Point, has been the site of industrial activities since the late 1850s. The area has supported such industries as gun powder magazines, sugar processing, electrical and city gas generation, and shipbuilding. Based on literature searches, no prehistoric cultural resource sites were identified in the area. However, research indicated that prehistoric Native American populations heavily used the entire shoreline of San Francisco Bay. Therefore, the potential to encounter prehistoric cultural resources on the alternative sites is similar.

The entire Potrero Point area has had industrial activity over the last century. There is a moderate potential of encountering buried historical resources during construction of a power plant at all of the alternative sites. During test trenching conducted in 1979 by Wirth and Associates, a portion of a powder magazine was encountered. Therefore, the potential to impact buried historic resources in the area of the alternative project sites is deemed similar.

The MUNI site is undeveloped land and has no permanent structures. Therefore, there are no buildings on the site with cultural significance.

The Mirant site has two buildings onsite that CEC staff has previously found to be eligible for historic status (the Compressor House and Meter House). Siting the SFERP at the Mirant site would require demolition of the Compressor House and Station A. However, this impact could be partially mitigated by retaining the Meter House for use in the SFERP. Additionally, the siting of a power plant on this site could change the existing setting of the Union Iron Works Pier 70 Historic District, located north of the proposed site. However, a power plant on the Potrero Power Plant site would result in a minor alteration in the setting of this large potentially historic district, and would not be significant.

The Port of San Francisco's Pier 70 site includes part of the Union Iron Works Pier 70 Historic District, which consists of 23 buildings and structures. If construction of a power plant on this site could be accomplished within an existing structure without significantly altering the structure, then the impact could be lessened. However, construction of a power plant within an existing historic structure would result in a considerable increase in the power plant construction costs. Furthermore, even with treatment of those features extending outside of the existing structure, some change in the setting and feel could occur to the historic district.

The Illinois Street property includes potentially historic sugar warehouses. However, it is unlikely that these properties would have to be demolished to accommodate a power plant on the property.

Thus, the cultural impacts on alternative sites would be most severe at the Pier 70 property, followed by the Mirant property. Impacts on the MUNI, Illinois, Western Pacific and Cesar Chavez properties would be substantially similar.

9.4.3.4 Land Use

The proposed and alternative project sites are located in San Francisco and are zoned heavy industrial. The siting of a power plant on any of the alternative sites is consistent with current zoning. However, the Port of San Francisco's Pier 70 property is part of an area that

is potentially eligible to be an historic district and includes historic buildings. Thus, siting of a power plant on this parcel may result in impacts to historic structures. In addition, the Port plans to develop and integrate the Western Pacific site into the Pier 80 marine terminal operations immediately adjacent to the south. It is uncertain whether siting a power plant on the Western Pacific site would either be compatible with Port plans or consistent with the Port's mandate to use its public trust property to promote waterborne commerce, navigation, and fisheries.

With the No Project Alternative, the land uses would remain as they are and are presumed to be consistent with existing land use plans and policies.

9.4.3.5 Noise

The ambient noise levels in the vicinity of the alternative project sites are dominated by vehicular traffic and the industrial nature of the area. The ambient noise levels are expected to be in the range of 55 dBA L_{90}. The alternative project sites near 23rd and Illinois streets have the potential of impacting residential uses being located in the commercial areas (live/work units). The MUNI, Western Pacific, and Cesar Chavez sites are further from residential receptors and would hence have lesser impacts on residential receptors. However, considering the noise attenuation/screening provided by existing and planned buildings in the area, ambient noise levels are not expected to increase significantly due to operation of the SFERP. Therefore, the proposed project site and the alternative sites are expected to have comparable noise impacts.

The No Project Alternative would not result in further development in these areas and ambient noise levels would remain unaffected. However, the potential to reduce noise from existing in-City generation at Potrero power plant would be lost.

9.4.3.6 Public Health

All of the alternative sites are located in an industrial area of San Francisco, with nearby commercial/residential uses. Public health impacts are generally related to air quality, which is not expected to result in significant impacts. At a screening level, the sites appear equivalent with respect to this environmental resource.

Under the No Project Alternative, the Potrero power plant would continue to operate, resulting in more severe air quality impacts and associated Public Health impacts.

9.4.3.7 Worker Health and Safety

Potential impacts on worker health and safety are activity-specific rather than site-specific. Regardless of the location, the City will prepare appropriate health and safety plans to protect workers and reduce the potential for injuries. For the proposed site, the City's offsite consequence analysis has confirmed that releases of aqueous ammonia to residential/commercial areas (to the north, south and east of the proposed site) would be at a concentration of less than 5 ppm. Although concentrations to the west of the proposed site would be higher than 5 ppm, because the property to the west is owned by the City, the City can and will take steps to minimize the risk of exposure by City workers.

Under the No Project Alternative, there would be no construction and, therefore, no impacts to workers.

9.4.3.8 Socioeconomics

All sites are located in San Francisco. In the case of all the site alternatives, most local purchases for construction and operation would be made in the greater Bay Area and would be the same regardless of the plant's location.

For all site alternatives, the workforce would likely come from San Francisco and the greater San Francisco Bay Area with its large, highly skilled construction work force.

Because SFERP would be City-owned, no property taxes would be collected. Therefore, no jurisdiction would receive property taxes from this plant and there would be no difference from alternate sites.

Thus, the socioeconomic impacts would be similar among the alternatives since they are located near each other in San Francisco.

All of the alternative project sites are located within Southeast San Francisco. Therefore, the environmental justice issues would be substantially similar for all of the sites, although maximum distance from residential neighborhoods would be an advantage.

With the No Project Alternative, no economic benefits would be realized within the region of influence.

9.4.3.9 Agriculture and Soils

The proposed and alternative project sites are located in urban, developed areas with no agricultural resources. Furthermore, due to the proximity of these sites to each other, the soil conditions are expected to be comparable. Therefore, impacts to agricultural and soil resources are expected to be comparable among these sites.

Under the No Project Alternative, agricultural and soils resources will not be affected.

9.4.3.10 Traffic and Transportation

Major freeways in proximity to the alternative site include Interstate 280 (I-280) and U.S. Highway 101 (U.S. 101). From I-280 southbound, access to the alternative sites is via the 25th Street exit. From I-280 northbound, access is provided by the Cesar Chavez Street exit. From U.S. 101, access to and from the alternative sites is via the Cesar Chavez Street interchange for both northbound and southbound traffic. Major and secondary arterial roadways within alternative site vicinity include Third Street, Bayshore Boulevard, Cesar Chavez Street, 23rd Street, and 25th Street.

Third Street, extending north from its interchange with U.S. 101 and Bayshore Boulevard to its intersection with Market Street, functions as the principal north-south arterial within the area. It serves as the main commercial street, as well as a primary access route to industrial development along San Francisco's southern waterfront.

Cesar Chavez Street is a 4-lane major arterial and a Citywide Bicycle Route that extends to the west, traversing the Mission District and terminating at Guerrero Avenue. Cesar Chavez Street provides direct access to both I-280 and U.S. 101. Direct access to the Mirant site and other alternative sites is provided by 23rd Street. This roadway is undivided and provides one lane of travel in each direction.

Illinois Street is a wide two-lane undivided roadway west of the alternative sites and provided access to all of the sites. Traffic is controlled at the intersections of Illinois Street and 23rd and 25th streets.

Bayshore Boulevard is designated as a Neighborhood Commercial Street and a Citywide Bicycle Route. This 4-lane arterial parallels U.S. 101, running from Third Street north to Cesar Chavez Street. Bayshore Boulevard is divided with a raised median, except for openings at intersections with exclusive left-turn lanes.

Since the alternative project sites all use the same system of roads and highways, the impacts due to construction and operation of a power plant at these sites are considered similar. Furthermore, traffic and transportation impacts associated with the construction and operation of the power plant at the MUNI site are considered less than significant.

The No Project Alternative would allow traffic to be maintained at current levels.

9.4.3.11 Visual Resources

The character of the alternative sites is heavily industrialized, with Port of San Francisco, Mirant's Potrero power plant, and the Port's container terminal. To the west of the alternative sites is an area of commercial/light industrial uses, with residential uses interspersed. The City of San Francisco is allowing live/work development to occur in the area, which allows encroachment of non-conforming residential uses to occur in an area zoned industrial. The City considers these live/work units to be industrial uses.

The proposed power plant will require exhaust stacks approximately 85 feet tall, which will blend into the industrial nature of the existing environment. Views from residential areas will be screened for the Mirant, Illinois, and Port of San Francisco's Pier 70 sites by existing commercial and industrial facilities. Additionally, these sites would have significant industrial facilities in the background, which will result in a power plant sited at these locations to blend into the environment, to some extent.

The MUNI, Cesar Chavez, and Western Pacific sites will also have significant industrial facilities in the backgrounds, but do not have the same level of commercial/industrial buildings screening these sites. However, MUNI is planning to build a new streetcar maintenance facility which when constructed may obstruct views of these sites.

From the standpoint of residential neighborhoods, the visual impact of the Mirant, Illinois and Pier 70 sites is similar and currently slightly better than the MUNI, Cesar Chavez, and Western Pacific sites. When the new MUNI streetcar maintenance facility is constructed, the visual impact of all sites on residential neighborhoods is likely to be substantially similar.

The No Project Alternative would avoid visual impacts from the development of a power plant. However, it would foreclose or delay closure of the Potrero Power Plant.

9.4.3.12 Hazardous Materials Handling

The same quantity of hazardous materials would be stored and used at the proposed and alternative project sites. Further, as stated earlier, the proposed and the alternatives sites are in relative proximity. Thus, the impacts from hazardous materials handling would not be substantially different among the sites. The City's offsite consequence analysis has confirmed

that releases of aqueous ammonia to residential/commercial areas (to the north, south, and east of the proposed site) would be at a concentration of less than 5 ppm. Although concentrations to the west of the proposed site would be higher than 5 ppm, because the property to the west is owned by the City, the City can and will take steps to minimize the risk of exposure by City workers. Potential impacts would be further reduced in the case of the proposed site and alternative sites with additional distance from residences such as the MUNI, Western Pacific, and Cesar Chavez sites. However, because the potential impact on residences is already minimal, the additional benefit of further distance is not significant.

The No Project Alternative would avoid the transportation, use, and storage of hazardous materials from construction and operation of the SFERP. However, if as a result of the No Project Alternative, Potrero power plant operates significantly longer, the use of additional hazardous materials would result, particularly given the installation of SCR on the plant.

9.4.3.13 Waste Management

The same quantity of waste will be generated at the proposed site as at all alternative sites. The environmental impact of waste disposal would not differ significantly between the alternative sites.

The No Project Alternative would eliminate the need to dispose of liquid and solid waste from the construction and operation of the SFERP but would maintain the need to dispose of liquid and solid waste from existing in-City generation.

9.4.3.14 Water Resources

The City is proposing to use recycled water for most plant uses and potable water for domestic uses. Once the project is operational, wastewater and stormwater from the proposed and alternative sites will be directed to the City's combined sewer system. Therefore, the water resources impacts will be similar for all of the alternative sites, except the Cesar Chavez site, which would be too small for a water treatment plant to be located onsite.

The No Project Alternative would require sewage to be discharged in its current manner. While salt loadings would not change, this would avoid the additional salt concentrations that would occur from the plant's liquid waste stream being returned to the treatment plant. However, the No Project Alternative would not assist in reuse and disposal of wastewater from the City's SEWPCP. Moreover, with the No Project Alternative, existing water and sewer use by in-City generation would continue.

9.4.3.15 Geologic Hazards and Resources

Due to the screening level of this analysis and proximity of the sites to each other, no site-specific seismic analysis was performed. The potential for seismic impacts would be essentially the same for all plants and can be addressed in plant design.

The No Project Alternative would not affect geological hazards or resources.

9.4.3.16 Paleontological Resources

All of these sites are located primarily on artificial fill overlying either rocks of the Franciscan Complex or late Pleistocene to Holocene alluvium of the Temescal Formation.

Each of the stratigraphic units, other than the artificial fill, has produced significant and scientifically important fossils in the San Francisco area. In addition, fossil sites were documented as occurring near the alternative project sites, and one known site is located near the Cesar Chavez site. Therefore, all sites are considered to have an equal potential for paleontological impacts.

9.5 Selection of the Proposed Site

Table 9-3 compares the potential environmental impacts of the proposed MUNI site with the other alternatives. As shown in the table, no alternative site would feasibly attain most of the basic objectives of the project while also avoiding or substantially lessening any potentially significant effects of the project.

TABLE 9-3
Comparison of the Proposed Site and Alternative Site Locations

Characteristic	MUNI Site	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70 Site	Cesar Chavez Site	Illinois Street Site
Potential Presence of T&E Species/Habitat	Low	Low	Low	Low	Low	Low
Potential Cultural/ Historic Sensitivity	Moderate	Moderate to High	Moderate	High	Moderate	Moderate
Appropriate Zoning	Yes	Yes	Yes	Yes	Yes	Yes
Proximity to Nearest Receptors	Within 1,600 feet	Within 600 feet	Within 2,000 feet	Within 900 feet	Within 1,400 feet	Within 600 feet
Risk to Humans from Deposition of Air Pollutants	Low	Low	Low	Low	Low	Low
Removal of Prime Agricultural Land	No	No	No	No	No	No
Traffic & Transportation	Low	Low	Low	Low	Low	Low
Potential Visual Sensitivity	Low to Moderate	Low	Low to Moderate	Low	Low to Moderate	Low
Risk to Humans from Off-site Migration of Hazardous Materials	Low	Low	Low	Low	Low	Low
Ability to Use Water Consistent with SWRCB Policy	Yes	Yes	Yes	Yes	Uncertain	Yes

TABLE 9-3
Comparison of the Proposed Site and Alternative Site Locations

Characteristic	MUNI Site	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70 Site	Cesar Chavez Site	Illinois Street Site
Potential Paleontological Sensitivity	Low	Low	Low	Low	Low	Low
Availability of Property	City-owned	Land purchase could not be completed	City-owned; Subject to Trust	City-owned; limited by Burton Act	No interest in selling	Uncertain, complex ownership

The proposed MUNI site and two of the four alternatives, Illinois Street and Cesar Chavez sites, would avoid the cultural impact of demolishing a potentially historic building without creating similar associated impacts. The Mirant site would have a cultural impact caused by the demolition of the Compressor House and Station A, which the project could attempt to mitigate through restoration of the Meter House. The Pier 70 location includes significantly more historic structures than the Mirant site, which would have to be either incorporated into the plant design, substantially increasing the cost of the project, or demolished.

The Mirant and Illinois sites are similar, being adjacent, as they are near tall industrial structures (PG&E's substation and Mirant's Potrero Power Plant) in a heavily industrialized area, and are adjacent to the PG&E Substation and natural gas pipelines. Although both sites would require the demolition of existing structures currently onsite, an advantage of the Illinois site is that demolition of historic buildings could largely be eliminated whereas use of the Mirant site requires demolition of the Compressor House and Station A. There are a number of uncertainties associated with the Mirant site due to Mirant's bankruptcy, legal actions brought by the City related to Mirant's conduct during the State's energy crisis and delinquent taxes owed by Mirant to the City. Thus, a timely land purchase that could support the SFERP development is unlikely. Timely purchase of the Illinois site was also deemed unlikely. The Illinois site involves a complex land ownership structure and there has been a general lack of interest in a sale on the part of the owners. A further disadvantage of the Illinois property is that it would likely have required the City to acquire substantially more property than needed to site the SFERP with the attendant additional costs.

The Port of San Francisco's Pier 70 site is also close to the required infrastructure (natural gas and the PG&E Substation). However, the site is part of a potential historic district and would require either the alteration of historic buildings or their removal.

The MUNI site is a 4-acre, undeveloped parcel owned by the City. It is close to the required infrastructure and is located further away from residential use area than some of the other proposed sites. After MUNI constructs its maintenance facility to the west, this new facility would tend to screen most of the proposed power plant's features from views.

The Western Pacific 9-acre site may not be compatible with the Port's plans to enhance its marine terminal capabilities at Pier 80. In addition, given the uncertainty as to consistency of the proposed use under the trust doctrine, the entitlement process for the project use at this

location would be lengthy, and the outcome uncertain. The City has therefore determined that the MUNI site is preferable.

The Cesar Chavez site is located west of the Western Pacific site and is private property. The site does not contain historic buildings. However, the MUNI site was determined by the City to be preferable in light of the lack of interest in a sale by the owner. Moreover, the small size could create construction challenges, increased operation costs, and uncertainty regarding the use of recycled water for cooling because a water treatment plant would need to be located elsewhere.

9.6 Alternative Air Pollution Emission Control Analysis

The proposed project is required to comply with the requirements of the Bay Area Air Quality Management District's (BAAQMD's) permit regulations requiring the application of the Best Available Control Technology (BACT) to control air emissions. To comply with the BAAQMD's BACT requirements for oxides of nitrogen (NO_x), the project's design includes water injection and selective catalytic reduction (SCR) to control NO_x emissions. The SCR technology proposed for the SFERP uses a 29 percent solution of ammonia to reduce NO_x emissions to elemental nitrogen, water, and a small quantity of unreacted ammonia. However, the use and storage of ammonia—even the less toxic 29 percent aqueous ammonia proposed for the SFERP project— represents a potential risk to the public in the event of a catastrophic breach of the storage tank. The offsite consequence analysis (presented in Subsection 8.12, Hazardous Materials Handling, of the AFC) shows that if the SFERP's ammonia storage tank were breached, the resulting ammonia concentrations (at publicly accessible areas along the project's eastern, northern, and southern fence lines would be below the olfactory level for most people (less than 5 parts per million). Therefore, the potential impacts associated with the project's use and storage of ammonia would not result in a significant public health impact. However, to provide a comprehensive analysis of the alternative project configuration, the remainder of this section presents alternative NO_x emission control technologies considered for the project. The information presented below is based on the air quality analysis presented in Appendix 8.1B of the AFC.

Potential NO_x control technologies for combustion gas turbines include the following:

- **Combustion controls**
  - Water injection
  - Steam injection
  - Dry combustion controls
  - Dry low-NO_x combustor design
  - Catalytic combustors (e.g., XONON)
- **Post-combustion controls**
  - Selective non-catalytic reduction (SNCR)
  - Non-selective catalytic reduction (NSCR)
  - Selective catalytic reduction (SCR)
  - SCONO$_x$™

The technical feasibility of available NO_x control technologies are presented below.

9.6.1 Combustion Modifications

9.6.1.1 Wet Combustion Controls

Steam or water injection directly into the turbine combustor is one of the most common NO_x control techniques. These wet injection techniques lower the peak flame temperature in the combustor, reducing the formation of thermal NO_x. The injected water or steam exits the turbine as part of the exhaust.

Although the lower peak flame temperature has a beneficial effect on NO_x emissions, it can also reduce combustion efficiency and prevent complete combustion. As a result, carbon monoxide (CO) and volatile organic compounds (VOCs) emissions increase as water/steam injection rates increase.

Water and steam injection have been in use on both oil- and gas-fired combustion turbines in all size ranges for many years, so these NO_x control technologies are clearly technologically feasible and widely available. The proposed SFERP's LM6000 combustion turbines employ water injection to control NO_x emissions.

9.6.1.2 Dry Combustion Controls

Combustion modifications that lower NO_x emissions without wet injection include lean combustion, reduced combustor residence time, lean premixed combustion, and two-stage rich/lean combustion. Lean combustion uses excess air (greater than stoichiometric air-to-fuel ratio) in the combustor primary combustion zone to cool the flame; thereby, reducing the rate of thermal NO_x formation. Reduced combustor residence times are achieved by introducing dilution air between the combustor and the turbine sooner than with standard combustors. The combustion gases are at high temperatures for a shorter time, which also has the effect of reducing the rate of thermal NO_x formation.

The most advanced combination of combustion controls for NO_x is referred to as dry low-NO_x (DLN) combustors. DLN technology uses lean, premixed combustion air to keep peak combustion temperatures low, thus reducing the formation of thermal NO_x. This technology is effective in achieving NO_x emission levels comparable to levels achieved using wet injection without the need for large volumes of purified water and without the increases in CO and VOC emissions that result from wet injection. However, this control technology does not result in lower NO_x emissions than can be achieved using water injection on the LM6000 combustion turbine.

Catalytic combustors use a catalytic reactor bed mounted within the combustor to burn a very lean fuel-air mixture. This technology has been commercially demonstrated under the trade name XONON in a 1.5-MW natural gas-fired combustion turbine in Santa Clara, California. The technology has not been announced commercially for the engines used at SFPUC. No turbine vendor, other than Kawasaki, has indicated the commercial availability of catalytic combustion systems at the present time; therefore, catalytic combustion controls are not available for this specific project and are not discussed further.

9.6.1.3 Post-Combustion Controls

SCR is a post-combustion technique that controls both thermal and fuel-bound NO_x emissions by reducing NO_x with a reagent (generally ammonia or urea) in the presence of a catalyst to form water and nitrogen. NO_x conversion is sensitive to exhaust gas temperature, and performance can be limited by contaminants in the exhaust gas that may mask the catalyst (sulfur compounds, particulates, heavy metals, and silica). SCR is used in numerous gas turbine installations throughout the United States, almost exclusively in conjunction with other wet or dry NO_x combustion controls. SCR requires the consumption of a reagent (ammonia or urea) and requires periodic catalyst replacement. Estimated levels of NO_x control are in excess of 90 percent.

Selective non-catalytic reduction (SNCR) involves injection of ammonia or urea with proprietary conditioners into the exhaust gas stream without a catalyst. SNCR technology requires gas temperatures in the range of 1,200 to 2,000° F and is most commonly used in boilers. The exhaust temperatures for the SFERP gas turbines are in the 800° F range, which is well below the minimum SNCR operating temperature. Some method of exhaust gas reheat, such as additional fuel combustion, would be required to achieve exhaust temperatures compatible with SNCR operations, and this requirement makes SNCR technologically infeasible for the SFERP.

Nonselective catalytic reduction (NSCR) uses a catalyst without injected reagents to reduce NO_x emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion (IC) engines, and employs a platinum/rhodium catalyst. NSCR is effective only in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen, and this condition does not occur in turbine exhaust where the oxygen concentrations are typically between 14 and 16 percent. For this reason, NSCR is not technologically feasible for the SFERP.

$SCONO_x$™ is a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. The catalyst is a monolithic design, made from a ceramic substrate with both a proprietary platinum-based oxidation catalyst and a potassium carbonate adsorption coating. The catalyst simultaneously oxidizes NO to NO_2, CO to CO_2, and VOCs to CO_2 and water, while NO_2 is adsorbed onto the catalyst surface where it is chemically converted to and stored as potassium nitrates and nitrites. The $SCONO_x$ potassium carbonate layer has a limited adsorption capability and requires regeneration approximately every 12 to 15 minutes in normal service (see Appendix 8.1B for details). Each regeneration cycle requires approximately 3 to 5 minutes. At any point in time, approximately 20 percent of the compartments in a $SCONO_x$ system would be in regeneration mode, and the remaining 80 percent of the compartments would be in oxidation/absorption mode.

There are serious questions about the probability of a successful commercial demonstration and the commercial availability of the $SCONO_x$ technology for application to SFERP, as well as the levels of emission control that can be consistently achieved. Therefore, this technology is not considered feasible for the SFERP.

9.6.2 Alternatives to Ammonia-based Emission Control Systems

Over the last few years, several vendors have designed urea-based systems to generate ammonia onsite, thereby eliminating the need to transport and store ammonia. These units are referred to Ammonia on Demand (Environmental Elements Corporation) and Urea to Ammonia (EC&C Technologies Incorporated). However, on September 9, 2003, a permanent injunction was issued against Environmental Elements Corporation, barring the company from selling or manufacturing the Ammonia on Demand system due to patent infringement on EC&C Technologies Inc. Therefore, only EC&C's Urea to Ammonia (U2A) system is commercially available.

The U2A system generates ammonia from solid dry urea. The process starts by dissolving urea in deionized water to produce an aqueous urea solution. Steam is used in the U2A reactor to convert the urea solution into a gaseous mixture of ammonia, carbon dioxide, and water for use in the SCR system.

The U2A technology was first commercially installed on AES's Alamitos Generating Station (AGS) Unit 6, in Long Beach California, as a demonstration project. Unit 6 is a utility boiler that had an existing SCR system that used and stored ammonia. The U2A technology replaced the ammonia storage tank. Based on a successful demonstration of the U2A at AGS, AES contracted for the permanent installation of two U2A systems at its Huntington Beach Generating Station (HBGS) in Huntington Beach, California.

Based on the success of these projects, the U2A technology has been selected for a number of utility retrofit projects. However, as stated above, the U2A technology requires steam for the process to work and the SFERP project will not be generating steam. Therefore, this technology is not feasible for the SFERP. Furthermore, there is some concern regarding the applicability of the U2A technology for use on a peaking combustion turbine that is not expected to operate continuously.

9.7 Alternative Technologies

Section 3.0, Purpose and Need, addresses why the SFERP is needed to meet the City's objectives of shutting down existing dirty in-City generation while maintaining local reliability. That section discusses why transmission, energy efficiency improvements, renewable resources and distributed generation are insufficient to accomplish the City's objectives. This section discusses alternatives for generating technologies according to the fuel used.

- Oil and natural gas
- Coal
- Nuclear
- Hydroelectric
- Geothermal
- Biomass
- Solar
- Wind

Alternative technologies were evaluated with respect to commercial availability, implementability, and cost-effectiveness.

9.7.1 Oil; Natural Gas; Coal; Conventional and Supercritical Boiler/ Steam Turbine, or Combined-Cycle Combustion Turbine

These technologies are commercially available, and could be implemented. However, oil and coal technologies were eliminated from consideration because of their environmental impacts. Combined-cycle combustion turbines were eliminated from consideration because of timing considerations, the need for water and long unit startup times.

9.7.2 Nuclear

California law prohibits new nuclear plants until the scientific and engineering feasibility of disposal of high-level radioactive waste has been demonstrated. To date, the CEC is unable to make the findings of disposal feasibility required by law for this alternative to be viable in California. The technology, therefore, is not implementable.

9.7.3 Hydroelectric

No significant hydroelectric resource is available within San Francisco and thus would not facilitate the shutdown of within City generation in the near term, nor would it provide added reliability to the electrical system in San Francisco.

9.7.4 Geothermal

Geothermal development is not viable within San Francisco because suitable thermal vents and strata are not present. It was, therefore, eliminated from consideration.

9.7.5 Biomass

Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing waste, and construction and urban wood wastes. Their cost tends to be high relative to simple-cycle units burning natural gas and fuel supply reliability can be problematic in urban settings. Furthermore, this technology typically results in higher air emissions, water consumption/ discharge, and waste generation over the proposed project. Finally, this technology is typically used in baseload (continuous) operations and is not readily useful for peaking situations.

9.7.6 Solar

Most of these technologies collect solar radiation, heat water to create steam, and use the steam to power a steam turbine/generator. Power is only available while the sun shines so the units do not supply power that can be cycled up or down to follow demand. Given the objectives of this proposed project to improve the reliability of San Francisco's electrical system, this technology is not considered to be a feasible project alternative due to the limited size of the individual projects (less than a megawatt), and the sheer number of projects that would be required to generate 145 megawatts.

9.7.7 Wind Generation

In California, the average wind generation capacity factor has been 25 to 30 percent and, like solar, cannot be cycled up and down to track demand. There are no significant wind generation sites located in San Francisco. Furthermore, this technology would not increase the reliability of the electrical infrastructure sufficiently to facilitate the shutdown of within City generation.

9.8 References

California Energy Commission (CEC). 1995. 1994 Biennial Electricity Report (ER94), P300-95-002. November.

San Francisco Public Utilities Commission (SFPUC). 2002. The Electricity Resource Plan. Revised December 2002.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Air Quality	Emissions from the plant would be the same at every location. Given the design of the project, air impacts would be expected to be less than significant.	No difference.	No difference.	No difference.	No difference.	No difference.
Biological Resources	This industrial site is developed with no habitat value. No biological impacts are expected. Alternative sites are similar in nature.	No difference.	No difference.	No difference.	No difference.	No difference.
Cultural Resources	The Potrero Point area, due to the long history of industrial activity in the area, has a moderate potential for encountering buried historic resources during construction. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations.	The Potrero Point area, due to the long history of industrial activity in the area, has a moderate potential for encountering buried historic resources during construction. In addition, the site includes several historic buildings one of which can be included in the project's design. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations.	No difference.	The Port of San Francisco's Pier 70 site is located on the Union Iron Works Pier 70 Historic District, with 23 eligible historic buildings. The development of a power plant on this site would require the demolition or modification of a historic structure in a potentially eligible historic district. It is possible that the power plant could be developed to minimize impacts to historic structures, but in any event it would alter the feel and setting of the potentially eligible historic district.	The Potrero Point area, due to the long history of industrial activity in the vicinity, has a moderate potential for encountering buried historic resources during construction. The shoreline of the San Francisco Bay was heavily used by prehistoric Native American populations. The site includes potentially historic buildings, in particular sugar wear-houses; but a power plant could likely be constructed without demolition of these buildings.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Land Use	The site is zoned Industrial.	No difference from proposed site.	The site is zoned Industrial. The Port Commission plans to develop and integrate this site into its adjacent Pier 80 marine terminal. The property is subject to the public trust for navigation, waterborne commerce and fisheries. There is uncertainty as to the compatibility of the project with the planned use of the site, and the consistency of the project with the public trust doctrine. The entitlement process would be lengthy, and the outcome uncertain.	The site is zoned Industrial. The Port Commission plans to preserve the complex of historic structures located on and around this site, and is commencing a master planning process for the area to develop a mix of maritime, commercial, educational and recreational uses. This site is subject to the Burton Act.	No difference from proposed site.	No difference from proposed site.
Noise	The plant's noise output would be approximately the same at all sites. The nearest residence is located within 1,600 feet from the site.	The plant's noise output would be approximately the same at all sites. The nearest residence is located within 600 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 2,000 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 900 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 600 feet from the site.	The plant's noise output would be approximately the same at all sites. However, the nearest residence is located within 1,400 feet from the site.
Public Health	The impacts are directly related to air quality impacts described above, considered to be less than to be significant.	No difference.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Worker Health and Safety	Safety training programs and general health and safety programs will be the same for all alternatives.	No difference.	No difference.	No difference.	No difference.	No difference.
Socioeconomics	Potential impact to schools and public services is anticipated to be less than significant and given the proximity of the sites to each other, impacts are expected to be similar at all locations. Because all the properties are located in Southeast San Francisco, the environmental justice impacts for all sites would be similar.	No difference.	No difference.	No difference.	No difference.	No difference.
Agriculture and Soils	The Potrero Point area has a long history of industrial activity that does not include agricultural uses. No impacts to agriculture and soils are expected.	No difference.	No difference.	No difference.	No difference.	No difference.
Traffic and Transportation	No hazardous intersections apparent. No significant impacts on traffic and transportation are expected.	No difference.	No difference.	No difference.	No difference.	No difference.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Visual Resources	Currently, the plant would be visible from views on Potrero Hill. However, after MUNI constructs its maintenance facility west of the site, the views will be partially screened by this facility. With mitigation measures, impacts would be less than significant.	The plant would be surrounded by other industrial/commercial structures that would partially screen most of the facility from the views of most viewers. With mitigation measures, impacts would be less than significant.	No difference from proposed site.	No difference from proposed site.	The plant would be surrounded by other industrial/commercial structures that would partially screen most of the facility from the views of most viewers. The plant would be located adjacent to a street and would require screening from travelers along the street. With mitigation measures, impacts would be less than significant.	Currently, the plant would be visible from views on Potrero Hill. However, if MUNI constructs its maintenance facility west of the site, then views will be partially screened by this facility. The plant would be located adjacent to a street and would require screening from travelers along the street. With mitigation measures, impacts would be less than significant.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Hazardous Material Handling	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. The off-site consequences analysis shows that the ammonia concentrations from the worst case release would not result in a significant impact in publicly accessible areas due to a catastrophic release of ammonia. Moreover, the City will work with MUNI to address any potential risk to workers on the adjacent site. Because the sites are relatively close to each other, it is expected that impacts from hazardous waste handling would be similar.	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. The off-site consequences analysis shows that the ammonia concentrations from the worst case release would not result in a significant impact in publicly accessible areas due to a catastrophic release of ammonia. Because the sites are relatively close to each other, it is expected that impacts from hazardous waste handling would be similar, although impacts could be more problematic in the case of the Illinois Street and Cesar Chavez locations where the plant would be located close to the street.	No difference from proposed site.	No difference from proposed site.	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. Because the plant would be located close to the street, the plant would have to be designed such that publicly accessible areas are not impacted in the event of a catastrophic release of ammonia.	Aqueous ammonia shipments would likely be delivered using US 101, exiting on Cesar Chavez, which is a designated truck route. Because the plant would be located close to the street, the plant would have to be designed such that publicly accessible areas are not impacted in the event of a catastrophic release of ammonia.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Waste Management	The City will implement measures to comply with San Francisco's recycling goals and with these measures the project's contribution to total waste generated in the county will be minimal. Hazardous waste treatment and disposal capacity in California is more than adequate. Accordingly, waste management will not create a significant impact. Impacts at all sites is expected to be similar.	No difference.	No difference.	No difference.	No difference.	No difference.
Water Resources	Would use recycled wastewater, a potential beneficial impact. Recycled wastewater would be used at all of the alternatives sites.	No difference from proposed site.	No difference from proposed site.	No difference from proposed site.	No difference from proposed site.	Use of recycled water is uncertain because site is not large enough to put onsite and the SEWPCP does not currently provide recycled water.

TABLE 9-2
Summary Comparison of Environmental Effects of Alternative Project Sites

Resource	MUNI Site (Proposed)	Mirant Site	Western Pacific Site	Port of San Francisco's Pier 70	Illinois	Cesar Chavez
Geologic Hazards	No known natural resources occur in the site and the project will be designed and constructed to withstand ground-shaking. Thus, geologic impacts are expected to be less than significant. Because of their proximity, alternatives sites are expected to have similar geologic impacts.	No difference.	No difference.	No difference.	No difference.	No difference.
Paleontological Resources	The stratigraphic units underlying the site have produced significant and scientifically important fossils in the San Francisco area. Nonetheless, with mitigation, the impact on paleontological resources is expected to be less than significant. Because of their proximity, alternative sites are generally expected to have similar impacts on paleontological resources.	No difference from proposed site.	No difference.	No difference from proposed site.	No difference from proposed site.	No difference.

SFPUC_

LEGEND

SITE ALTERNATIVES

SITE LOCATION

ELECTRIC TRANSMISSION LINE

NATURAL GAS SUPPLY LINE

POTABLE WATER LINE

PROCESS WATER SUPPLY

COLLECTION BOX

0 500 1,000 Feet

N

Source:
1. Base map is from aerial photograph, 2002 from AIRPHOTO, USA

FIGURE 9-1
ALTERNATIVE SITES CONSIDERED

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\SFPUC\MXDS\9-1_ALTERNATIVES_SUPPLEMENTA.MXD

FIGURE 9-1
ALTERNATIVE SITES CONSIDERED
SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
SUPPLEMENT A

PDD \\LOKI\PROJECTS\PDDGIS\SFPUC\MXDS\9-1_ALTERNATIVES_SUPPLEMENTA.MXD 2/23/2005 16:05:32

SECTION 10.0

Engineering

SECTION 10.0

Engineering

10.1 Introduction

This section and its related appendices, together with Sections 2, 5, 6, and 7, present information concerning the design and engineering of the San Francisco Electric Reliability Project (SFERP). Subsection 10.2 describes the design of the facility with reference to Section 2, Project Description. Subsection 10.3 discusses the reliability of SFERP. Subsection 10.4 presents the estimated thermal efficiency of the facility. Subsection 10.5 describes the laws, ordinances, regulations, and standards (LORS) applicable to SFERP engineering and identifies agencies that have jurisdiction. Subsection 10.6 provides the contact persons within those agencies.

10.2 Facility Design

A detailed description of the SFERP is provided in Subsection 2.2, Project Description, Design, and Operation. Safety design features are described in Subsection 2.3, Facility Safety Design.

Summary descriptions of the design criteria are included in Appendix 10A, Civil Engineering Design Criteria; Appendix 10B, Structural Engineering Design Criteria; Appendix 10C, Mechanical Engineering Design Criteria; Appendix 10D, Electrical Engineering Design Criteria; Appendix 10E, Control Engineering Design Criteria; and Appendix 10F, Chemical Engineering Design Criteria. Appendix 10G, Geologic and Foundation Design Criteria, sets forth a geotechnical assessment of the SFERP project site.

Design and engineering information and data for the following systems are found in the following parts of the supplement to the Application for Certification (AFC):

- **Power Generation**—Subsection 2.2, Project Description, Design, and Operation
- **Heat Dissipation**—Subsection 2.2, Project Description, Design, and Operation
- **Cooling Water Supply System**—Subsection 2.2, Project Description, Design, and Operation
- **Air Emission Control System**—Subsection 2.2, Project Description, Design, and Operation, and Subsection 8.1, Air Quality
- **Waste Disposal System**—Subsection 2.2, Project Description, Design, and Operation, and Subsection 8.13, Waste Management
- **Noise Abatement System**—Subsection 8.5, Noise
- **Switchyards/Transformer Systems**—Section 5, Electric Transmission

10.3 Reliability

This section discusses the availability of fuel, the expected service life of the plant, and the degree of reliability to be achieved by SFERP.

10.3.1 Fuel Availability

The approximately 900-foot natural gas supply pipeline to SFERP will be connected to Pacific Gas and Electric Company's (PG&E's) Line 101, which is one of three supply lines to PG&E's San Francisco Load Center located adjacent to PG&E's Potrero Substation. The San Francisco Load Center is supplied by three natural gas lines (101, 109, and 132), which will provide the SFERP facility with a reliable source of natural gas. The SFERP facility has no backup fuel supply.

10.3.2 Plant Availability

SFERP is a peaking facility and therefore does not have some redundancy that a base load plant may require. SFERP will be designed for an operating life of 30 years. Reliability and availability projections are based on this operating life; however, the actual operating life will be based on City of San Francisco (City) policy, economics, and other factors. Operation and maintenance procedures will be consistent with industry standard practices to maintain the useful life status of plant components.

The SFERP simple-cycle power block consists of three natural gas-fired combustion turbine generators (CTGs). The CTG power block is projected to operate between 15 and 100 percent of the time during each year of its operating life. The percentage of time that the power block is projected to operate is defined as the "service factor." The service factor considers the amount of time that a unit is operating and generating power, whether at full or partial load. The projected service factor for the power block, which considers projected percentage of time of operation, differs from the "equivalent availability factor" (EAF), which considers the projected percentage of energy production capacity achievable. EAF is defined as a weighted average of the percentage of full energy production capacity achievable. The projected EAF for SFERP is estimated to be in the range of 94 to 98 percent. The EAF differs from the "availability of a unit," which is the percentage of time that a unit is available for operation, whether at full load, partial load, or on standby.

10.3.3 Water Availability

Makeup supply water will be process water provided by the City and County of San Francisco (City), which will be treated onsite to California Code of Regulations (CCR) Title 22 recycled water standards. The recycled water plant receives its water from a new City process water supply line from a collection box near Marin and Cesar Chavez streets in San Francisco. A backup supply is provided by an appropriate connection (air gap separation of recycled and potable water systems) to the City potable water system. Process water is produced by an onsite water treatment system from the process water supply. Water for potable use at SFERP is from a connection to the City potable water system in 25th Street. An onsite recycled water storage tank provides enough water for short-term operation and controlled shutdown of the plant. An onsite demineralized water storage tank provides water for short-term periods of operation of the gas turbines.

10.3.4 Wastewater Disposal Availability

SFERP wastewater disposal consists of waste from the recycled water treatment plant, nonhazardous cooling water, and other nonhazardous industrial wastewater streams. This combined stream will be returned to the City combined sewer system. Most hazardous wastes will be collected and recycled by permitted recycling firms, and hazardous wastes that cannot be recycled will be collected by a licensed hazardous waste hauler and deposited in a licensed hazardous waste landfill. For detailed information on the use of hazardous materials and management of wastes, see Subsections 8.12 and 8.13.

10.4 Efficiency

SFERP plant efficiency, approximately 36 percent, is one of the highest thermal efficiencies available from a natural gas-fired, gas-turbine, simple-cycle power plant. This level of efficiency is achieved when each combustion turbine operates at base load (100 percent load) with water injection for performance enhancement and emissions control. Operation at partial output will result in lower efficiencies.

The minimum fuel gas consumption is determined by the minimum operating load on a single CTG.

SFERP's net annual electrical production cannot be forecast accurately because the plant will be operated as a dispatchable power plant. The maximum annual generation possible from the facility is estimated to be roughly 580 gigawatt hours (GWh).

10.5 Laws, Ordinances, Regulations, and Standards

The LORS that are applicable to the design of SFERP are referenced in Table 10-1. LORS applicable to the environmental areas of the AFC (Subsections 8.1 through 8.16) are contained within each of the environmental sections. The project will conform to all of these LORS.

Appendices 10A through 10G contain the discipline design criteria that will be used in SFERP design. Appendices 10A and 10B address the physical design criteria for the site-related features, structures, and foundations of the facility. Appendices 10C through 10F provide the design criteria for SFERP systems and equipment, including the codes and standards that apply to the design, materials, fabrication, and erection of the systems and equipment. The project will also comply fully with these codes and standards. Appendix 10G, Geologic and Foundation Design Criteria, includes the geotechnical assessment of the MUNI Metro East Maintenance Facility just west of the SFERP project site. A geotechnical assessment of the SFERP site is scheduled and the completed report will be submitted to the California Energy Commission when available.

TABLE 10-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Location in Supplement for Facility Design Compliance	Conformance
Federal:		
Occupational Safety and Health Act (OSHA) – 29CFR1910 and 29CFR126	Subsection 8.7	Meet Requirements
Environmental Protection Agency (EPA) – 40CFR60, 40CFR75, 40CFR112, 40CFR302, 40CFR423, 40CFR50, 40CFR100, 40CFR260, 40CFR300, and 40CFR400	Subsection 8.1 and Section 10	Meet Requirements
California:		
California Code of Regulations (CCR) – Title 8, Sections 450 and 750 and Title 24, 1995, Titles 14, 17, 19, 20, 22, 23, and 26.	Section 10	Meet Requirements
California Department of Transportation (Caltrans)-Standard Specifications	Subsection 8.10	Meet Requirements
California Occupational Safety and Health Administration (Cal-OSHA) – Regulations and Standards	Subsection 8.7	Meet Requirement
California Business and Professions Code – Sections 6704, 5730, and 6736	Section 10	Meet Requirements
California Vehicle Code – Section 35780	Subsection 8.10	Meet Requirements
California Labor Code – Section 6500	Subsection 8.7	Meet Requirements
Local:		
City and County of San Francisco – Regulations and Ordinances	Section 10	Meet Requirements
Industrial:		
Civil Engineering Design Criteria	Appendix 10A	Meet Design Criteria
Structural Engineering Design Criteria	Appendix 10B	Meet Design Criteria
Mechanical Engineering Design Criteria	Appendix 10C	Meet Design Criteria
Control Engineering Design Criteria	Appendix 10E	Meet Design Criteria
Chemical Engineering Design Criteria	Appendix 10F	Meet Design Criteria
Geologic and Foundation Design Criteria	Appendix 10G	Meet Design Criteria

10.6 Involved Agencies and Agency Contacts

Table 10-2 contains a list of involved agencies and agency contacts.

TABLE 10-2
Agency Contacts

Agency	Contact	Telephone
CCSF Department of Planning 1660 Mission Street San Francisco, CA 94103	Jasper Rubin, Planner	(415) 558-6310
San Francisco Fire Department	Mary Boucher, Fire Inspector	(415) 558-3306
San Francisco Department of Public Health	Sue Cone, Program Manager	(415) 252-3991